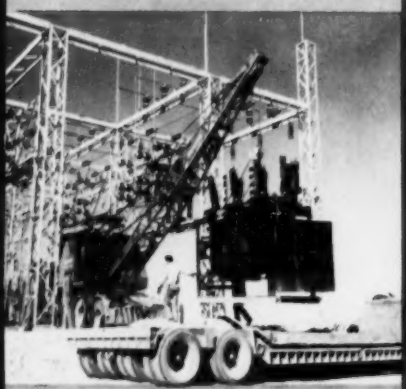
New General Plant Facilities

New Activity on the Snake



New Load . . . New Substations

New Equipment on the Move

ELECTRICAL WEST

February 1957
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

THE WESTERN ELECTRICAL UTILITY INDUSTRY

PURCHASE ORDER

ORDER NO. WEST---1957

MAIL INVOICES IN TRIPLICATE TO ABOVE ADDRESS AND BILLS OF LADING OR EXPRESS RECEIPTS AND SHIPPING MEMOS DIRECT TO CONSIGNEE

THIS PURCHASE ORDER NUMBER MUST BE SHOWN ON TAG, BOX, BILL OF LADING OR EXPRESS RECEIPT AND INVOICE.

Electrical Equipment Manufacturers
Contractors and Engineers
All Vendors

DATE Feb 1957
F.O.B.
VIA Best Way
TERMS net

SHIP TO THE WESTERN ELECTRICAL UTILITY INDUSTRY

BY OR BEFORE EXPEDITE

CARE OF

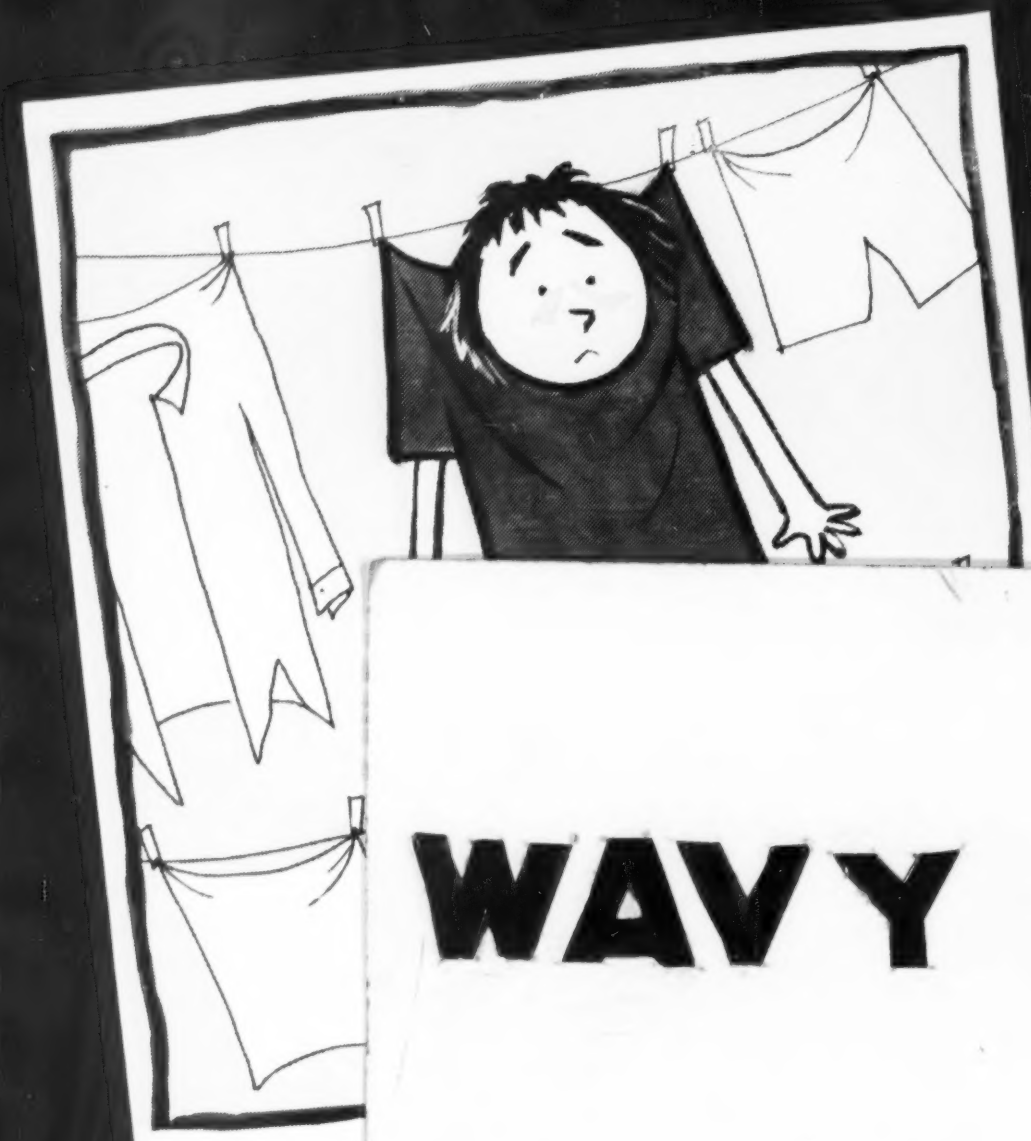
ITEM NO.	OUR STOCK NUMBER	QUANTITY	DESCRIPTION	PRICE
1		1,039,950 kw	Hydroelectric Generating Capacity	
2		951,500 kw	Steam Generating Capacity	
3		12,500 kw	Nuclear Generating Capacity	
4		2,960 mi	High-Voltage Transmission Line	
5		6,040 mi	Distribution Lines	
6		7,230,000 kva	Transmission Substations, Structures, Auxiliaries	
7		2,700,000 kva	Distribution Substations, Structures, Auxiliaries	
			Lot Net Price	$ 1,016,000,000.00

Annual Review and Forecast

The Billion Dollar Budget 93
Map of New Generating Facilities 95
Utility Spending Plans for 1957 98
Utility Statistics for 1956 98

Regional News Roundups - - - - - 17 . . . Malibu Fire - - - - - - 153
Market Development - - - - - 137 . . . Contractors' Letter - - - - - 127
Sales Guide - - - - - - - 33 . . . Industry News - - - - - - - - - 148

Edison
is selling the
advantages
of electric drying...
to speed up
your
electric dryer
sales



WAVY

SH

Tell him it's you without an electric clothes dryer — hung up and "washed up" after you've stretched, stooped and pinned your way through still another basket of clothes.

Tell him the cure: a shiny new electric dryer. It saves you the lifting and bending and dependence on the weather. It saves clothes — they dry fluffier, cleaner and fresher smelling. They last longer, too.

Tell him it has to be an *electric* dryer, of course. Because it's so safe. Because you simply plug it in. Because it costs less to buy! Because Edison rates are among the lowest in the country. (Electricity is your biggest bargain in modern living.)

SOUTHERN CALIFORNIA Edison COMPANY

LIVE BETTER—ELECTRICALLY

Long, trouble-free life . . . . . $

Faster installation . . . . . $

More light . . . . . $

Less maintenance . . . . . $

. . . . . $

. . . . . $

. . . . . $

. . . . . $

merchandise . $

s . . . . . $

ts . . . . . $

OT-HOLMAN n/c
ATING . . . . . .

add up Smoot-Holman's lighting dividends...

PAGES

Let a Smoot-Holman lighting expert prove that good lighting costs you nothing. Call the nearest Smoot-Holman office or write direct.

SMOOT-HOLMAN INGLEWOOD, CALIFORNIA

WE SUPPORT THE NATIONAL LIGHTING BUREAU

service in the west and southwest for all school, commercial and industrial lighting.

Edison
is selling the
advantages
of electric drying...
to speed up
your
electric dryer
sales

SHOW THIS TO YOUR HUSBAND!

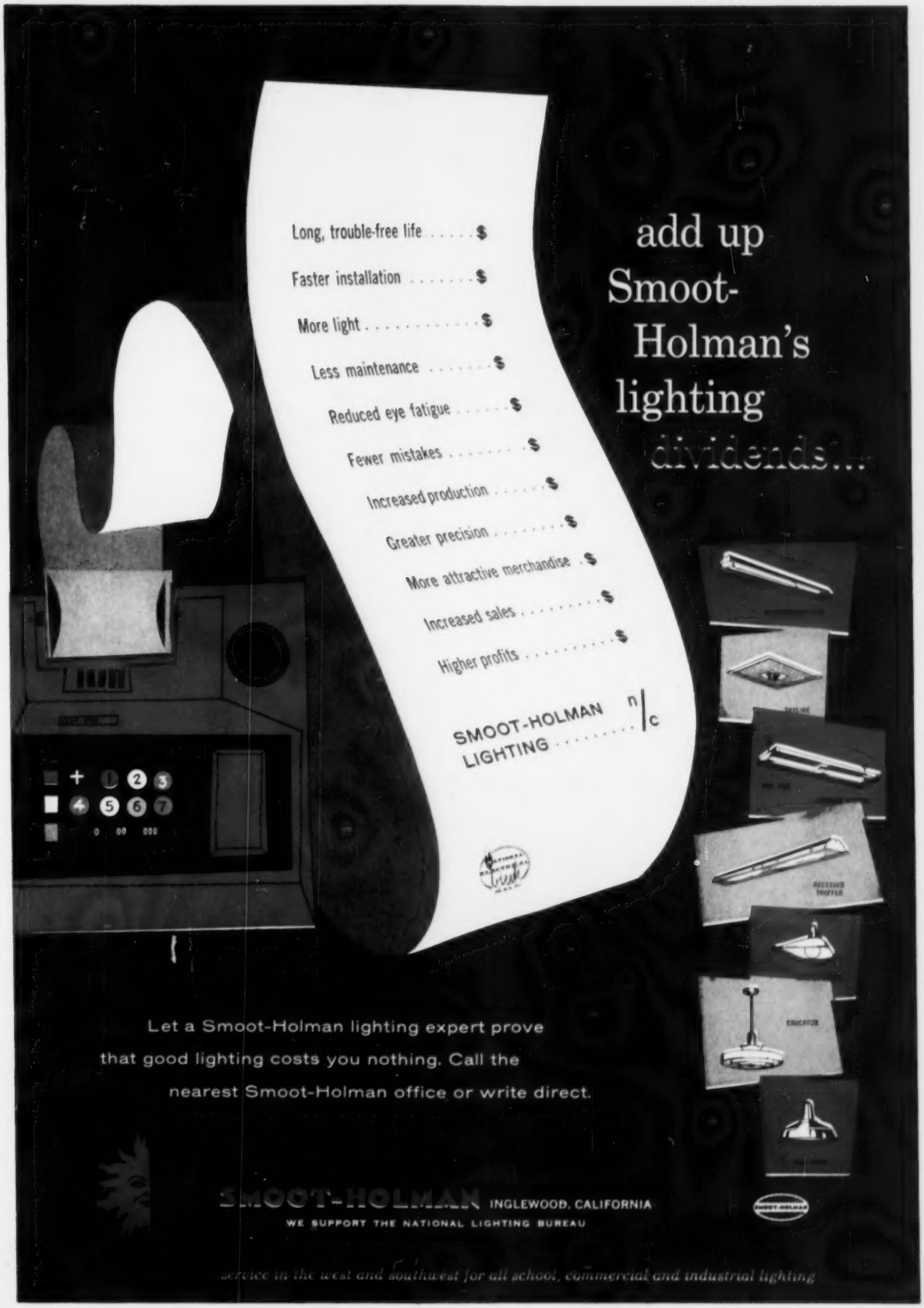
Tell him it's you without an electric clothes dryer — hung up and "washed up" after you've stretched, stooped and pinned your way through still another basket of clothes.

Tell him the cure: a shiny new electric dryer. It saves you the lifting and bending and dependence on the weather. It saves clothes — they dry fluffier, cleaner and fresher smelling. They last longer, too.

Tell him it has to be an *electric* dryer, of course. Because it's so safe. Because you simply plug it in. Because it costs less to buy! Because Edison rates are among the lowest in the country. (Electricity is your biggest bargain in modern living.)

SOUTHERN CALIFORNIA Edison COMPANY

LIVE BETTER—ELECTRICALLY


Long, trouble-free life . . . . . $
Faster installation . . . . . $
More light . . . . . $
Less maintenance . . . . . $
Reduced eye fatigue . . . . . $
Fewer mistakes . . . . . $
Increased production . . . . . $
Greater precision . . . . . $
More attractive merchandise . $
Increased sales . . . . . $
Higher profits . . . . . $
SMOOT-HOLMAN LIGHTING . . . . . n/c
add up Smoot-Holman's lighting dividends...
Let a Smoot-Holman lighting expert prove that good lighting costs you nothing. Call the nearest Smoot-Holman office or write direct.
SMOOT-HOLMAN INGLEWOOD, CALIFORNIA
WE SUPPORT THE NATIONAL LIGHTING BUREAU
service in the west and southwest for all school, commercial and industrial lighting

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

THE ALL-INDUSTRY MAGAZINE OF PROGRESS, ESTABLISHED 1887,
and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Seventieth year of publication.

George C. Tenney, Publisher
C. W. Leihy, Editor
W. A. Cyr, Consulting Editor
Peggy Boyer, Associate Editor
Jack Robinson, Engineering Editor
Dale VanHorn, News Editor
Miriam Stuart, Editorial Assistant

Regional Editors
Frank Pitman, Intermountain
Barbara Moskowitz, Pacific Southwest
Berkeley Snow, Pacific Northwest

CONTENTS

VOL. 118, NO. 2 FEBRUARY 1957

38th Annual Review and Forecast

Billion Dollar Budget 93

The West's Growth at a Glance 94

Calendar of New Generation 96

Utilities Will Spend $1.016 Billion in 1957 98

DEPARTMENTS

Associations	140	New Products	24
Contractors' News Letter	127	News	148
Editorials	124	News Roundup	8
Electra's Husband	38	Regional Roundup	17
How're We Doing?	5	Sales Guide News Letter	33
Market Development	137	Advertising Index	170

Next Month

The Engineering Section in March will include articles on Public Service of New Mexico's Reeves station and the Yuma Axis steam plant of Arizona Public Service Co. Coming up are stories on series capacitors for distribution transformers and lightning protection for substations. March will also carry 1956 complete sales figures as reported by Western utility executives.

Cover photos: General headquarters building, Puget Sound Power & Light Co., at Bellevue, Wash.; Brownlee plant site on the Snake, Idaho Power Co.; new breaker for Southern Colorado Power system; Morro Bay power plant, Pacific Gas and Electric Co.

ADVERTISING REPRESENTATIVES

Chicago (11)	Michael I. O'Connell, 520 N. Michigan Ave.
Cleveland (15)	Frank Seiler, R. A. Hubley, 1510 Hanna Bldg., Superior 1-7000
Los Angeles (17)	E. E. Schirmer, 1125 West 6th St., MA. 6-9351
New York (36)	G. W. Simpson, 330 W. 42nd St.
San Francisco (4)	Tom Carmody, Dick Alcorn, 68 Post St., DO 2-4600
	Bernice Johnston, Advertising Production Manager

Offices: Atlanta, Boston, Dallas, Detroit, Philadelphia, Pittsburg, St. Louis

ELECTRICAL WEST (with which is consolidated The Journal of Electricity). FEBRUARY 1957. Vol. 118, No. 2. Published monthly by McGraw-Hill Company of California. **Executive, Editorial and Advertising Offices: 68 Post St., San Francisco 4, Calif.** Publishing office: 235 N.W. Park Ave., Portland 9, Ore. James H. McGraw, (1860-1948), Founder; Donald C. McGraw, Chairman of the Board; George C. Tenney, President; John W. Otterson, Vice-President; B. M. Boccoli, Secretary and Treasurer. **Subscriptions: Address correspondence to Electrical West—Subscription Service, 68 Post St.; San Francisco 4, Calif. Allow 30 days for change of address. Please indicate position and company connection on all subscription orders.** Single copies 25c (November issue 50c). Subscription rates—U. S. possessions and Latin American Republics: $2 a year; $3 for two years; $4 for three years. Canada $2.50 a year; $5 for three years. All other countries $3 a year, $5 for two years; $6 for three years. Printed in U.S.A.

© Copyright 1957 by McGraw-Hill Publishing Company of California. All rights reserved.

Entered as second class matter, Dec. 17, 1956 at the post office at Portland, Ore., under the act of March 3, 1879. Postmaster: please send notice 3579 to Electrical West, 68 Post St., San Francisco 4, Calif.

Racks are designed for a minimum space requirement and can be passed through a 30"-diameter manhole.

Submersible equipments...

L-M's New Secondary Network Capacitors Increase Capacity, Improve Voltage

Line Material's new 216 volt, 13⅓ kvar submersible capacitor equipments can be your answer to heavier network loading. Secondary capacitors will improve the low power factor of heavy motor loads, such as air conditioning. This substantially reduces loading on conductors and transformers, and helps to improve low voltage conditions. Capacitor units can be installed more quickly and at much less cost than system changes, such as larger transformers, cables and additional vaults.

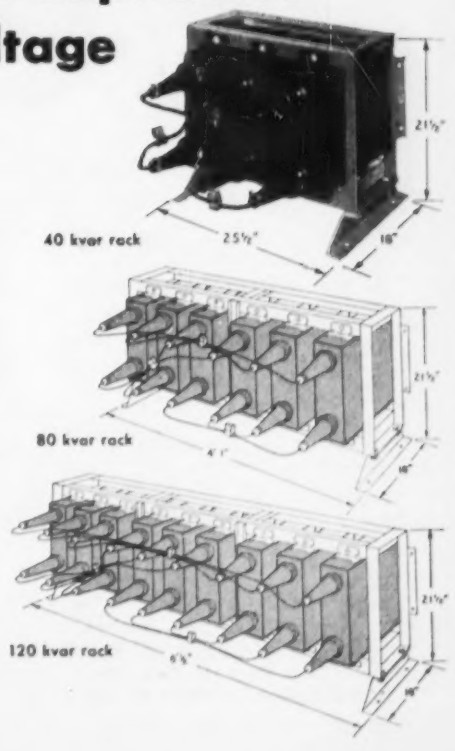
L-M's new secondary capacitors have outstanding product features such as aluminum metallic coating under a primer and finish coat of alkyd resin paint, strong solder-sealed bushings, and low-temperature Elemex liquid dielectric. Each unit is equipped with one terminal mounted current limiting fuse; bushings are enclosed in water-tight covers.

Capacitor Racks

Capacitor units are available in 40, 80, and 120 kvar racks, entirely assembled at the factory and ready for installation in the field. Racks can be stacked or mounted on floor, wall, or ceiling in many arrangements to fit vault space. Ambient temperature limits are 55° C. for single-tier equipments and 40° C. for two- or three-tier equipments.

Get Complete Information

Ask the L-M Field Engineer for information on features, design, and delivery on L-M's new secondary network capacitors and capacitor equipments. Or write Line Material Company, Milwaukee 1, Wisconsin



LINE MATERIAL

A McGRAW ELECTRIC COMPANY DIVISION

Elemex® Capacitors

247

Now for "Preferred-Emergency" Switching

an Off-the-Shelf

AUTOMATIC TRANSFER PANEL

With *Any Desired* Throwover Scheme ...at the *Flip of a Switch!*

A Flip of the Switch Gives You:

- Choice of making either source preferred.
- Choice of automatic or manual (semi-automatic) return.
- Adjustable time delays —range up to 10 minutes.
- Optional manual operation of line switches.
- Choice of returning: in either open or closed transition (with or without paralleling).
- Optional lockout on bus faults.

Other Unique Features:

- Indicating lamps for switch positions, live sources, and lockout action.
- Alarm to prevent leaving panel set on "manual operation."
- Transparent cover over selector switches prevents unintended changes in settings.

Saves Time and Money

You don't have to design and build (or negotiate for) — your special automatic transfer panels in order to get the special specific throwover schemes you need. The new S&C Automatic Transfer Panel will give you any or all throwover options... selector switches give the scheme you want!

With this new stock panel you can eliminate the engineering and correspondence involved in getting custom-built panels.

Furthermore, you are sure of getting what you want today; tomorrow you can change your mind, and later you can revise the scheme—still using the same transfer panel. Imagine! You can order your panel ahead of time, before specifications are settled.

— Buy from our stock for your stock —

Specialists in High-Voltage Circuit Interruption since 1910

S&C ELECTRIC COMPANY

4425 RAVENSWOOD AVENUE • CHICAGO 40, ILLINOIS, U. S. A.

In Canada: S&C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ontario

POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

ELECTRICAL WEST'S
Editorial Advisory Board

Pacific Southwest Region

J. F. Davenport, Vice-President & General Manager
Southern California Edison Co., Los Angeles
R. H. Cockfield, Business Agent
Department of Water & Power, Los Angeles
Joseph Pengilly, Vice-President
Square D Co., Los Angeles
Leonard Hobbs, President
Smooth-Holman Co., Inglewood
Harry Gerster, Vice-President
General Electric Supply Co., Los Angeles
Sidney Hill
Hill Electric Co., Los Angeles
C. M. Smith, Sales Manager
Fluor Corp., Los Angeles
Victor Hartley, Managing Director
PCEA, Los Angeles

Northern California Region

Walter Maytham, Vice-President
Westinghouse Electric Corp., San Francisco
Norman R. Sutherland, President
Pacific Gas & Electric Co., San Francisco
Fred Nicholas
F. M. Nicholas Co., San Francisco
Alfred H. Meyer, President
Leo J. Meyberg Co., San Francisco
Arthur Dahl, Sales Manager
General Electric Supply Co., San Francisco
Paul Churchill, Regional Manager
General Electric Supply Co., San Francisco
Paul Churchill, Regional Manager
Line Material Co., South San Francisco
George Abbett, President
Abbett Electric Co., San Francisco
Karl Bausch, Chief Electrical Engineer
Bechtel Corp., San Francisco
Frank Bagha
Bagha, Wier & Finato, San Francisco

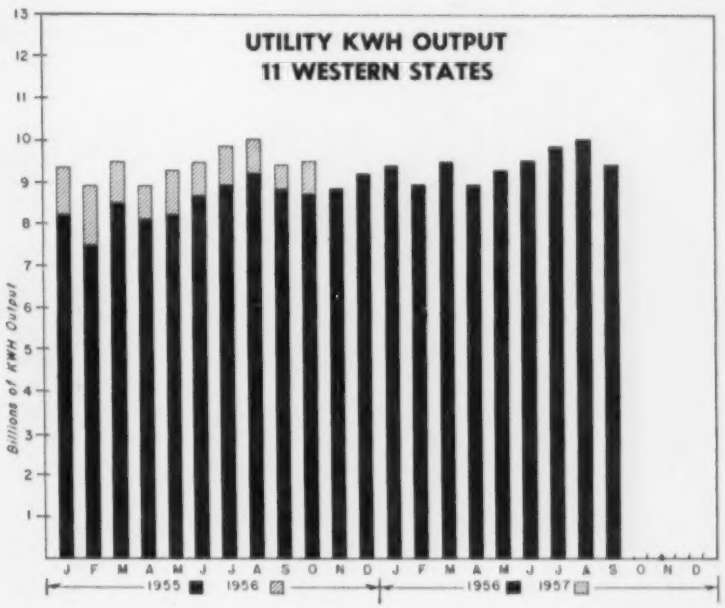
Intermountain Region

Don Hitchcock, Manager
Graybar Electric Co., Denver
R. D. Moody, Manager
Allis-Chalmers Mfg. Co., Denver
David B. Hyer Jr., President
Southern Colorado Power Co., Pueblo
R. W. Akerlow
Stearns-Roger Mfg. Co., Denver
Don Larson, Mgr., Rocky Mt. Chapter
NECA, Denver
Ralph Johnson, Vice-President & General Manager
Sturgeon Electric Co., Denver
Ken G. Eaton, District Manager
Anaconda Wire & Cable Co., Denver
Howard Peterson
Peterson Co., Denver
Ralph Hubbard, Managing Director
RMEL, Denver
W. W. Bowman, Director of Publicity
Utah Power & Light Co., Salt Lake City
A. E. Fleming, District Manager
General Electric Supply Co., Salt Lake City
John Kimball, Vice-President & General Manager
Idaho Power Co., Boise

Pacific Northwest Region

Eric Nelson
Shaffer & Nelson, Seattle
Charles C. Cutter, Northwest Rep.
Federal Pacific Electric Co., Seattle
Ralph James
Northwestern Agencies, Seattle
R. B. Lane, President
Industrial Electric Co., Seattle
Beverly Travis, Consulting Engineer
Seattle
Eugene Starr, Chief Engineer
Bonneville Power Administration, Portland
Thomas W. Delzell, Chairman of Board
Portland General Electric Co., Portland
D. R. McClung, Executive Vice-President
Pacific Power & Light Co., Portland
James F. Grieve, Vice-President
C. C. Moore, Engineers, Portland
Max Wood
Schwager-Wood Co., Portland
Larry Rodgers, Manager
Oregon-Columbia Chapter
NECA, Portland
R. H. Stroufe, Executive Vice-President
Stubbs Electric Co., Portland
Alden F. Krieg, Managing Director
NELPA, Portland
Jack D. Stevens
Puget Sound Utilities Council, Seattle

----How're We Doing?



Output Comparisons

Year-to-year Kwh Output Changes in Western Regions and U. S.
Per Cent Changes Over Same Week One Year Ago

Week Ending	Rocky Mountain	Pacific Southwest	Pacific Northwest	U. S. Total
Dec. 8	+9.3	+ 9.8	+10.7	+5.4
Dec. 15	+9.4	+ 9.7	+ 7.7	+5.3
Dec. 22	+7.2	+10.8	+ 2.7	+5.3
Dec. 29	+9.5	+ 6.6	+ 6.6	+4.1

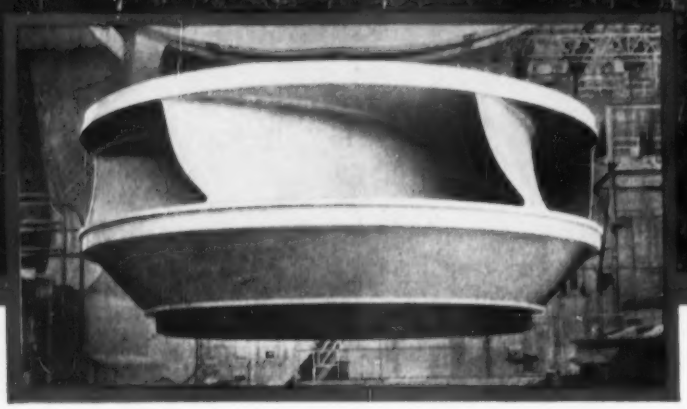
Energy Sales

Total residential sales in the 11 Western states for October 1956 totaled 1,905,038,000 kwh. This was a 8.1% increase over the same month of 1955. As total energy sales for the area increased 7.3%, the showing of the domestic users might well be taken to indicate that the Live Better . . . Electrically program is proving to be a good sales stimulator.

New Projects

The construction tempo out West is fast. Recently announced king-sized projects include a $7,000,000 housing development at Berkeley, Calif., a $1,000,000 shopping center for Reno, Nev., and another $20,000,000 shopping center for Ogden, Utah. Also in prospect are a $5,000,000 high school for the Portland area; a $30,000,000 housing project for San Carlos, Calif., and a 300,000-kw, $60,000,000 steam plant to be built by the Washington State Power Commission. For news of electric utility construction projects see pages 93 to 123. A billion dollars are budgeted this year!

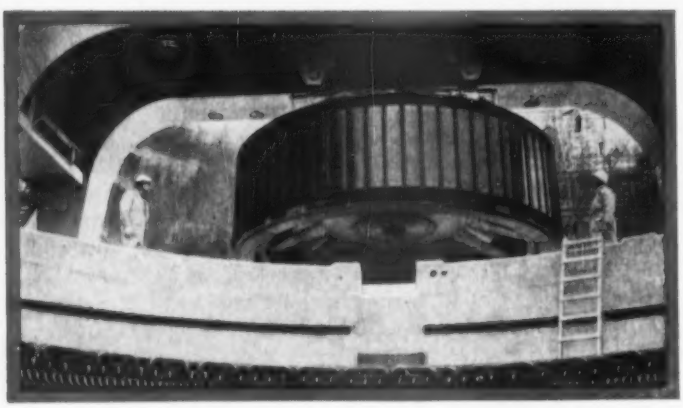
World's Largest Reversible



Shipped in three sections, this world's-largest Francis runner was assembled at the dam site.

At Hiwassee Dam, adding a pump-turbine, rather than a conventional turbine-generator unit, is expected to increase peaking capacity as much as 44,000 kw during extended periods of low water.

NOW Installed and Operating at TVA's Hiwassee Dam



Here, the 310-ton, 329-inch diameter generator-motor rotor is ready to be lowered into stator.

— storing off-peak power as re-usable water

ALLIS-

Pump-Turbine Combination

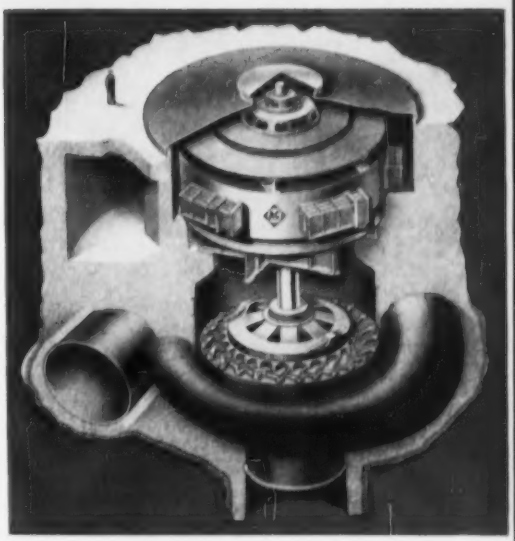
● In a single unit, this pioneering hydroelectric installation operates as a 70,000-kva turbine-driven generator when rotating in one direction, and as a 102,000-hp motor-driven pump when it rotates in the reverse direction.

As a turbine it has a maximum capacity of 112,000 hp to generate valuable peaking power during demand periods.

As a pump it has a rated capacity of 3900 cubic feet per second against 205-ft head — nearly three times the water requirements of New York City. When off-peak power is available from other plants on the TVA system, this unit — with its 102,000-hp motor, the world's largest — pumps water into storage for re-use during peaking periods.

This reversible pump-turbine is further proof that you get *MORE* design advances *first* from Allis-Chalmers — builder of over 15 million installed hydraulic turbine horsepower.

For all or any part of *your* needs, call the Allis-Chalmers representative near you, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin, U.S.A. Manufacturing plants in the United States and Canada.



In this cutaway view, size of pump-turbine unit is indicated by man standing on upper level.

NATIONAL ELECTRICAL Week
FEB. 10-16, 1957

CHALMERS

A-C ALLIS-CHALMERS

A-5119

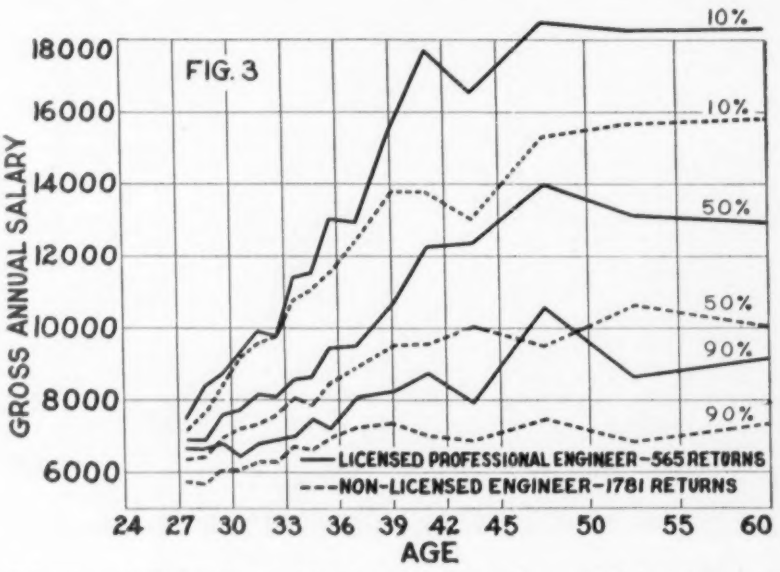
EW Power Reading

SIGNIFICANT ITEMS FROM THE EDITOR'S NOTEBOOKS

ADVANTAGES—Curves published in the "Integrator," official bulletin of the Schenectady General Electric Engineers Assn., indicate the advantage that the licensed engineer has over his unlicensed contemporaries. Other items on the salary subject:

AMA reports salaries up 8.6% from May 1955 to May 1956, a marked increase over the previous year's increase of 4.5%. AMA also reported that engineers with less than one year of experience are earning a median salary of $5,300 a year. The next higher category of engineers, with experience ranging from one to three years, had a median salary of $6,500.

The top ranges of the technical and professional group pay levels overlap with those of middle management. *However,* it was found that engineers and scientists are much less likely to receive bonuses than the middle management group.



G-S survey indicates that registered professional engineers lead in salary level

-EW-

Prosperity Note—Six out of 10 households own their own homes and three out of four have a TV set, according to latest government figures.

-EW-

TV SPEED-UP—The largest closed circuit television installation will soon be placed in operation at the Pennsylvania Railroad's New York terminal.

It will consist of 38 cameras which will scan availability boards for ticket clerks at the sales counters who can plug their receivers in to see the space situation for any train for several weeks ahead. This visual check plus an automatic printing system is expected to cut the purchaser's time per ticket to about 10 seconds.

Interesting because such installations give a hint as to why electrical load requirements are snowballing.

SWAN SONG?—The Eugene Water & Electric Board has asked the Federal Power Commission to extend the license for Beaver Marsh project for two years. Eugene voters rejected a bond issue for the project last March.

Oregon's Sen. Wayne Morse has followed through by telling FPC that "in the interest of orderly procedure and planning . . . the Beaver Marsh project should not be revived," and added the dam on the McKenzie River would be "incompatible" with permanent recreation plans of the U. S. Forest Service in the area.

-EW-

Pennsylvania Power & Light Co. is planning an atomic reactor with a thermal efficiency of around 27.5%. The designers point out that the efficiency is of lesser consequence since the reactor may be a "breeder" and cost of fuel will be negligible.

Engineers' Week, Feb. 17-23, 1957, has been recognized by President Eisenhower, the governors of most states and the mayors of hundreds of cities. Eleven sponsors, including Royal W. Sorensen of California Institute of Technology, have been appointed from among the nation's engineering great. Active programs are being developed locally throughout the country.

-EW-

PROGRESS REPORT—From the Atomic Industrial Forum comes a succinct summary of the significant growth in all phases of peacetime atomic activity in the U. S.

During 1956 the U. S. atomic industry began construction or received contracts for the building of 59 new nuclear reactors, including 30 research and test reactors and 29 power-type reactors. The research and test reactors will be built for

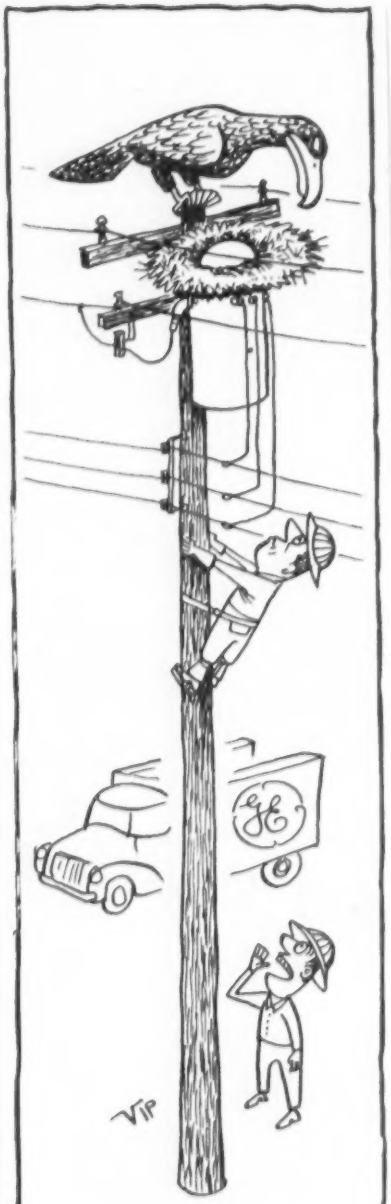
Carol®

A Subsidiary of Penn-Texas Corporation

NEMA

CAROL CABLE COMPANY • Division of the Crescent Company, Inc., Pawtucket, R.I.

• Portable Cords • Cordsets • Lamp Cords • Welding Cables • Thermostat Wires • Power Supply Cables



"Hurry, Smedley, you know G.E.'s reputation for fast transformer repair!"

Need distribution transformers uprated fast? Call a General Electric Apparatus Service Shop. The shop can uprate your old transformers in both kva and voltage for about two-thirds the cost of new transformers . . . can also convert to self-protected type. And you get new-transformer warranties. Call your G-E Apparatus Service Shop or Sales Office. 431-54

Progress Is Our Most Important Product

GENERAL ELECTRIC

private U. S. buyers, for the federal government and for overseas export. The power-type reactors are designed for naval and merchant ship propulsion, for prototype or demonstration reactors for the Atomic Energy Commission and for land-based power demonstration plants for private buyers in this country. In addition to these projects, industry carried forward work on previously awarded contracts for 17 reactors of various types and completed construction of two reactors which had been on order.

Also in the year past, American industry signed contracts or announced plans to build eight uranium ore processing mills, a feed materials plant, five nuclear fuel element manufacturing plants, seven critical facilities, three zirconium and two beryllium production facilities.

Industrial firms numbering 134 began using radioactive isotopes for the first time, bringing the total number of industrial users in this country to 1,121 firms in more than 1,500 geographic locations. More than 20 companies completed or planned to build major radiation research centers.

-EW-

Hoffman Electronics, talking about the "House of Tomorrow," conjectured on the possibility of a solar cell shingle roof. A 20x40-ft roof section could supply 8.8 kw per hour in sunlight. If this energy could be stored, only five days of sunlight a month would be sufficient to operate the home.

-EW-

HAPPY NEW YEAR – U. S. Department of Commerce prognostications for the first half of 1957 are as follows:

1. New orders for power generating equipment during the first half of '57 are expected to equal the volume of 1956—a record year.

2. Industrial activity in nuclear fields will expand at an accelerated rate.

3. Purchases of power transmission and distribution equipment, such as transformers and circuit breakers, about 12½% over '56.

4. New service and distribution equipment, wiring devices, lighting fixtures, motors and controls up about 10%.

NEW LOOK – If the observations of Col. Myron E. Page of the Corps of Engineers are correct, Columbia River navigation will eventually be more important to the area's economy than hydroelectric power.

His statement was made, incidentally, before the Spokane Chamber of Commerce. The area has one major postwar industry—light-metals production and fabrication—located there because of low-cost power.

Colonel Page said plans are being formulated to extend slackwater navigation some 30 miles past Lewiston, Idaho, and Army engineers predict that large tonnages of alumina, petroleum products and petroleum coke will move upstream in future years. Aluminum products and grain will move downstream.

-EW-

Engineering graduates are primarily interested in jobs offering continuous opportunities and a chance to work on stimulating problems as well as a chance to take on increased responsibility as they develop in their work. The graduate sees security as a chance to advance according to ability and to develop professionally and creatively, rather than merely a weekly pay check. High starting salaries, gimmicks and bonuses for accepting employment are likely to be rejected.

-EW-

RUMBLINGS – AEC's Chairman Strauss hinted that unless private industry steps up the development of atomic power, the government may have to initiate a supplementary program to speed atomic development. This may be the forerunner of hot debates in the new Congress over both reactor development and public power policies.

-EW-

REDUCTION – William H. McKinley, superintendent of the Anchorage municipal light and power system, is justly proud of the rate reductions the system has gained for its customers in recent years.

Dollar savings for customers started July 1, 1954, with a reduction of $75,000. Jan. 1, 1955, brought another $300,000 reduction, and on June 1, 1955, a third reduction amounted to $175,000. The final payoff came after a study made last

year which resulted in a reduction of $276,000 a year.

If the same amount of power being sold now had been sold in the first half of 1954, at the rates existing then, it would have cost the customers $1,000,000 more than it did in the last half of 1956.

-EW-

A southern utility company, reporting on 1,000 poles, most of which were 30 years old, found that 80% could be reused. The study concluded: (1) pole life can be extended by length-pressure treatment or groundline treatment of standing poles; (2) more information is needed about the incidence and progress of decay and deterioration of wood structures; (3) pole inspections and maintenance measures are required to secure optimum life; (4) design and construction procedures should be carried on with preservation in mind, eliminating cutting and boring whenever possible.

-EW-

Kaiser Steel Corp. reports that final 1956 figures on steel consumption in the seven Western states will probably show another new record high —about 6,500,000 tons. Significance of this fact is that nationally consumption will be lower than 1955, the previous record year.

-EW-

MERGER—The Crescent Co., Pawtucket, R. I., is well on the way to acquiring the Lowell Insulated Wire Co., Lowell, Mass.

President John M. Sapinsley of Crescent says acquisition of the new facilities marks a Crescent move to broaden its markets for insulated wire and cable.

-EW-

TEACHING TEACHERS—A summer fellowship program at Stanford University will give high school mathematics teachers an opportunity to study new aspects of their subject and its applications in science and industry.

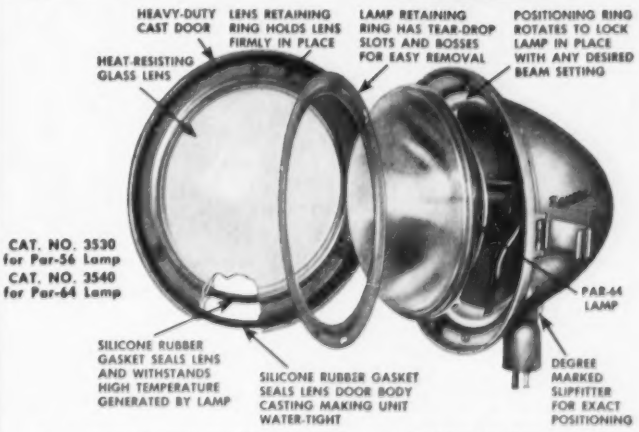
General Electric Co. is sponsor of the program, and will pay all expenses of the teachers that attend,

Change these Two Rings and You Convert This NEW Revere LAMP HOLDER for use with either a Par-64 or Par-56 Lamp

Fitter has 90° markings above and below horizontal. Covers full 180°.

. . . a great Revere Lamp Holder that offers great possibilities! Designed so that the lamp positioning rings and the retaining rings are interchangeable—thus accommodating a Par-56, 300 Watt, or a Par-64, 500 Watt Lamp of Narrow Spot, Medium Flood or Wide Flood Type. Not necessary to change the wiring.

Revere ELECTRIC MFG. CO. CHICAGO, ILL.
HEAVY DUTY CONVERTIBLE LAMP HOLDER


HEAVY-DUTY CAST DOOR
LENS RETAINING RING HOLDS LENS FIRMLY IN PLACE
LAMP RETAINING RING HAS TEAR-DROP SLOTS AND BOSSES FOR EASY REMOVAL
POSITIONING RING ROTATES TO LOCK LAMP IN PLACE WITH ANY DESIRED BEAM SETTING
HEAT-RESISTING GLASS LENS
CAT. NO. 3530 for Par-56 Lamp
CAT. NO. 3540 for Par-64 Lamp
PAR-64 LAMP
SILICONE RUBBER GASKET SEALS LENS AND WITHSTANDS HIGH TEMPERATURE GENERATED BY LAMP
SILICONE RUBBER GASKET SEALS LENS DOOR BODY CASTING MAKING UNIT WATER-TIGHT
DEGREE MARKED SLIPFITTER FOR EXACT POSITIONING

1 A versatile unit readily adaptable to change in Beam Candlepower.

2 Two SILICONE Rubber Gaskets *double seal* the unit against weather. *Gaskets will not char and smoke-up lens.*

3 STAINLESS STEEL Spring Toggle Latch holds sturdy lens cover — easy working — no fumbling with thumb screws.

4 Positioning Ring has slots to hold lamp in any position within circle.

5 Ring rotates and locks into place keeping lamp setting constant.

6 Lamp position stays put—unaffected during relamping or cleaning.

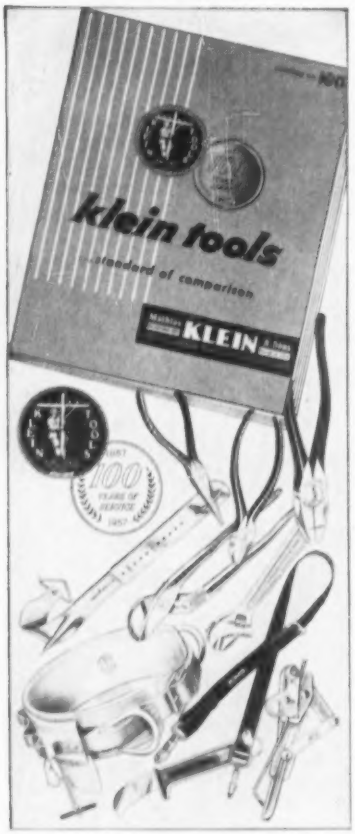
7 Housing precision-cast Aluminum Alloy. Strong, light in weight, dissipates heat faster.

This is a new addition to the extensive REVERE Line of Cluster-Lites and Fittings. With it you produce a workmanlike job that resists corrosion and retains its good looks for years. Write for data.

REVERE ELECTRIC MFG. CO. • 6009-17 BROADWAY • CHICAGO 40, ILL.
Available in Canada thru Curtis Lighting, Ltd., Leaside, Toronto, Ontario

THE ONLY COMPLETE LINE OF LUMINAIRES • FLOODLIGHTS AND POLES FOR STREET • SPORTS AIRPORT • SERVICE STATION • OUTDOOR THEATRE • MARINE AND INDUSTRIAL LIGHTING

NEW
KLEIN
CATALOG
FOR
• LINEMEN
• ELECTRICIANS
• INDUSTRY



100 years ago in 1857, Mathias Klein opened a little forge shop in Chicago. Out of this has grown the national institution known as Mathias Klein & Sons.

To dramatize this 100 years of service to industry, Klein has prepared a completely new catalog.

It contains illustrations and descriptions of the wide range of pliers, grips, climbers, belts, safety straps—the tools and equipment needed by linemen, electricians and industry.

A new feature is a section giving the dimensions of each plier—length of handle, length of cutting knives, width of head, size of point, etc.

This Klein Catalog No. 100 will be of interest to linemen—electricians—good workmen everywhere. A copy should be in the hands of every purchaser of good tools. Write for yours.

Mathias Klein & Sons
7200 McCORMICK ROAD • CHICAGO 45, ILLINOIS

including transportation, board and room, tuition and fees.

Aim of the program is to increase the teachers' awareness of the role their subject takes in contemporary civilization. It is further hoped they in turn will transmit their interest to their students and influence them to seek careers in mathematics.

This summer, 50 teachers from the 15 Western states will be selected for the course.

-EW-

Ole Svensen, our rough and tumble line construction foreman friend, bellowed to the top of a new tower: "Now if the dandy that dropped that bolt will kindly come down here we'll have our first lost-time injury of 1957."

-EW-

CALIFORNIA HIGHLIGHTS — From the annual report of the Public Utilities Commission of California some interesting figures emerge. Electric utility plant accounts of major utilities now total over $2.6 billion, just about three times its value in 1940. Seventy-seven per cent of the existing electric utility plant has been placed in service since the end of World War II.

In that same interval, customers have increased 102%, the kilowatt-hour per customer has increased 84% but kilowatt-hour total sales have jumped 271%.

At the end of 1956 there was well over 10,000,000 kw of capacity available in the state and more than 1,500,000 kw scheduled for completion in 1957 and 1958.

-EW-

TVA is now the largest coal user in the U. S.—a rather ironical switch for a project that started out as a flood-control measure.

-EW-

NEW ATOM PLANT — Directors of the New England electric system have authorized a new 200,000-kw nuclear power station to be built somewhere in the northeastern section of the country.

This region, being in a high fuel rate area, makes atomic economics more favorable there. A 134,000-kw plant at Rowe, Mass., is already under way.

CRUSADER — A proposal to tax public utilities owned by any agency of government will be presented to the 1957 California legislature.

Assemblyman Sheridan Hegland, La Mesa Democrat, is sponsoring the action to get more money for California schools.

Noting that individual taxpayers must make up the difference that the public utilities do not pay, he also pointed out that adoption of the bill would provide more equitable competition between public utilities and privately owned utilities.

-EW-

A heart ailment has claimed the life of Charles Leonard Pierce Jr., whose inventions were important to the early development of telephone and electric utility distribution systems. He was a retired chairman of the Hubbard & Co. board of directors, and was one of the founders of Lapp Insulator Co.

-EW-

Robert Holmes, governor-elect of Oregon, told the Izaak Walton League that Portland General Electric's Pelton project was the "wrong dam in the wrong place at the wrong time." He makes noises like a real politician.

-EW-

RECORD OF RECORD — The country's largest utility, the Pacific Gas and Electric Co., has pictorialized the postwar "Decade of Growth." This handsome brochure was done in a *Life* magazine format that is full of dramatic photographs that visualize the vast expansion in physical plant which has occurred in the past 10 years and has resulted in a net increase in system capacity of 2,848,600 kw of modern steam and hydro stations.

Each employee of the company will receive a copy of the brochure, which will likewise be used throughout the system to reach civic groups and other individuals and associations interested in California's and the company's progress.

-EW-

More on-the-job injuries occur between 10 and 11 in the morning than during any other hour of the day, according to California Department of Industrial Relations.

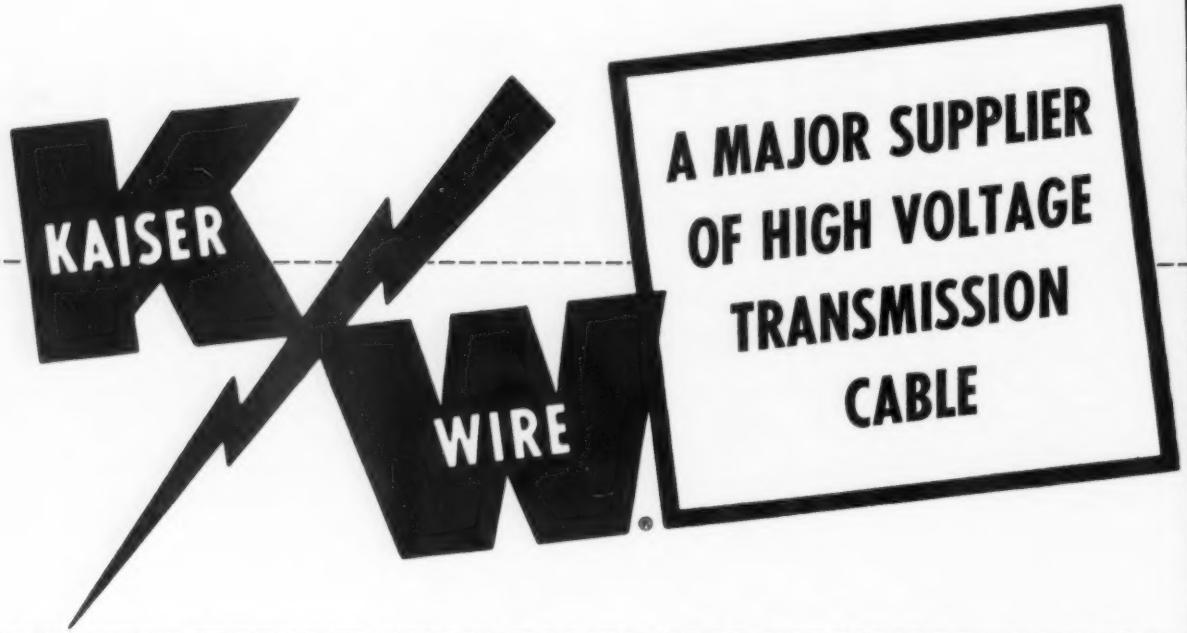
Meeting Growing System Needs

Another Allis-Chalmers network transformer goes into service—solving a load concentration problem. Compact design, rugged construction, conveniently located accessories — features that mean maximum dependability and easy maintenance have made this unit the logical choice of utilities everywhere.

If you have a system load problem, skilled, experienced Allis-Chalmers engineers will help you or your consultants in working out a solution. Call your Allis-Chalmers representative, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin, for further information.

ALLIS-CHALMERS

A-5177



FOR YOUR high voltage transmission program, think of Kaiser Aluminum—one of the industry's major suppliers of high voltage transmission cable.

For immediate attention, contact your Kaiser Aluminum sales office or one of our many distributors. Kaiser Aluminum & Chemical Sales, Inc., *Executive Office,* Kaiser Bldg., Oakland 12, Calif; *General Sales Office,* Palmolive Bldg., Chicago 11, Ill.

FLASH! Kaiser Aluminum has just purchased the Wire & Cable Division of U. S. Rubber. For full details, contact any Kaiser Aluminum sales office.

See "THE KAISER ALUMINUM HOUR." Alternate Tuesdays, NBC Network. Consult your local TV listing.

Kaiser Aluminum

Aluminum is the answer to Adequate Wiring

40%

30%

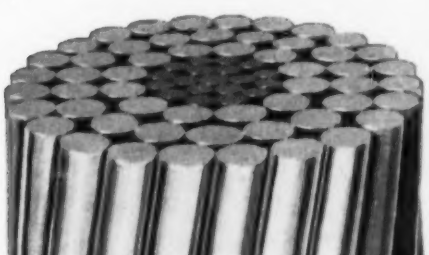
KAISER ALUMINUM *increased its sales of ACSR last year a whopping 38%!*

20%

THE INDUSTRY AS A WHOLE

increased sales of ACSR last year about 7%!

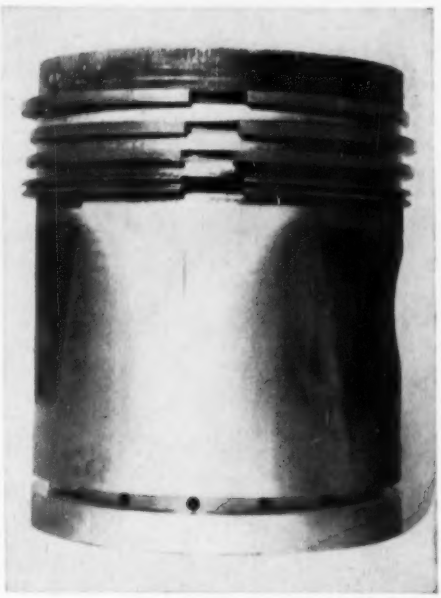
10%



Standard Engineer's Field Report

CASE HISTORY
RPM Delo Oils
LUBRICANT
Del Este Water Company
FIRM Modesto, Calif.

Engine powers pump for 28,000 hours—sleeve wear is less than 0.002 inch!



PUMPING UP TO 2200 GALLONS OF WATER PER MINUTE, a 165 h.p. natural gas fueled Waukesha engine ran 24 hours a day for more than three years in the Del Este Water Company plant at Modesto, California. Driving a turbine pump, it worked against a constant head, with speed controlled to maintain a set pump discharge pressure. In spite of this tough service, RPM DELO Special Lubricating Oil kept engine in perfect operating condition right up to time of inspection. Oil consumption actually was less for the last 8000 hours service than for the first 8000. Inspection showed sleeve wear only 0.001 to 0.0015" with no taper; crankshaft "miked" within factory standards. As shown above, rings and grooves are clean, sleeves unscored. Same sleeves and pistons were reinstalled and engine went back into pumping service.

RPM DELO LUBRICATING OILS

TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

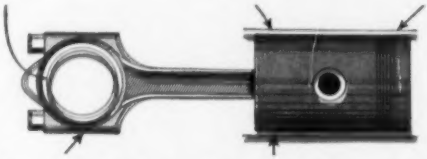
FOR EXPERT HELP on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative, or write to 225 Bush Street, San Francisco, California.

Why RPM DELO Oils prolong engine life

Special compounds stop corrosion

Anti-oxidant resists lacquer formation

Detergent keeps parts clean



Inhibitor resists foaming

Metal-adhesion qualities keep oil on parts in running or idle engines

STANDARD OIL COMPANY OF CALIFORNIA

Bay Area Region

SUNNYVALE plant of Westinghouse has been elevated to an operating division of the company, recognizing the plant's importance to the company, its customers and its Western market.

The new name of the plant is Sunnyvale Manufacturing Division of Westinghouse, and the manager of the new division is James S. Hagan, who comes here from Chicago. George Gayer, formerly plant manager, is now division engineering manager.

Two other title changes affect Joseph H. Cox, who is now engineering manager, electrical products, and George H. Heiser, who gets the new title of engineering manager, mechanical products.

Sunnyvale employs 3,200 people and produces a wide variety of electrical, steam and mechanical apparatus.

♦ Just to help keep the record straight, here's a boiled-down listing of the nine personnel changes at Pacific Gas and Electric Co. in recent weeks.

William N. Lindblad retired as chief of the bureau of tests and inspection, **Frank C. Rothganger** succeeded him.

Clair V. Wilbur retired from Stockton division manager duties, **George L. Works** succeeds him. Replacing Works as De Sabla division manager is **Kenneth C. Porter.**

Thomas B. Copeland retired as general superintendent of electric transmission and distribution and **C. R. Machen** stepped into the position.

Bert Dunshee has retired as manager of the land department and is succeeded by **Stanley B. Barton.**

♦ Fred Hall and his associates at American Truck Equipment in Oakland are busy installing the company's first application of a single hydraulic power source to operate winch, derrick, stabilizing jacks and earth-boring machines on line trucks. Installation is for Pacific Gas and Electric Co.

♦ Walter E. Michalke is joining the San Francisco force of Aluminum Co. of America as sales engineer in charge of electrical conductor. R. A. Rohn, district sales manager, tells us Michalke is an electrical engineer from the University of Texas, and comes here after six years with Alcoa in Charlotte, N. C. His sales territory will be northern California and Nevada.

♦ Allis-Chalmers has announced the promotion of two men in the Bay area. G. K. Lewis is now manager of utility sales and Alan Purchase is manager of industrial sales—both jobs in the San Francisco district. Both men are affiliated with AIEE, PCEA, Electric Club of San Francisco and the Engineers' Club of San Francisco. Purchase is also a member of the American Society of Mechanical Engineers. The parallel doesn't stop there, though. Both are engineering graduates of the University of California.

♦ Peter E. Mitchell and C. Lyn Fox have been reappointed as members of the California Public Utilities Commission for six-year terms.

♦ Mike Curry is loaded with news this month. He has moved to new offices and warehouse space at 220 15th St., San Francisco, has a new telephone number, MArket 1-1133, and has added a third salesman to his staff. New to Curry Co. but not to the Bay area is Frank King, who has been with General Electric Supply Co. here. Mike reports that he also added two lines as of Jan. 1. He now has Hatfield Wire & Cable in northern California and represents Westmoreland Mfg. Co., steel tube manufacturer.

♦ Here are the results of a rash of moves by electrical wholesalers in the northern California and adjacent areas. Only the new addresses are given.

Valley Electric Supply Co., 945 E. Lindsay, Stockton;

Electric Supply of Salinas, 406 Griffin St., Salinas;

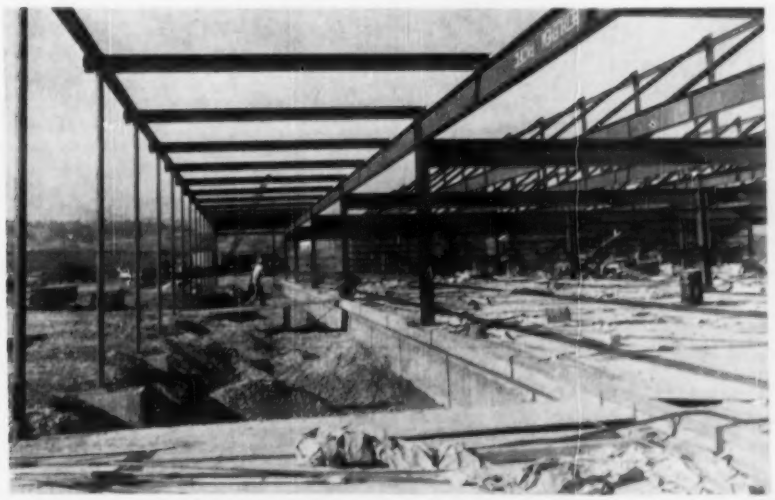
Osborne & Dermody, 6th & Evans, Reno;

Incandescent Supply Co., 1800 24th St., Sacramento;

Delta Electric Supply Co., 535 N. Visalia, Stockton.

♦ Bob Mayers, for 10 years with Pacific Gas and Electric Co. as a distribution engineer, has joined A. B. Chance Co. to work under Cranville Ryman, western regional sales manager. Bob had a two-week visit at the Centralia and St. Louis plants of the company before going to work.

♦ Shelton Fisher, publisher of *Power*, told San Francisco Electric Clubbers about his interesting visit to Russia.



Steelwork for the first building at Hewlett-Packard's new Palo Alto, Calif., headquarters has been completed by Bethlehem Pacific Coast Steel Corp. Located in the Stanford Industrial tract, the new building will be part of the integrated plant

Intermountain Region

MEMBERS of the six divisions of the Rocky Mountain Electrical League have elected new chairmen. They are: Utilities division—E. H. Pemberton, Southern Colorado Power Co., Pueblo; manufacturers' division—Thorle Vieau, Crouse-Hinds Co., Denver; distributors' division—Bob Barnes, B. K. Sweeney Co., Denver; contractors' division—D. D. Sturgeon, Sturgeon Electric Co., Denver; dealers' division—Ralph E. Wilson, Ralph Wilson Appliances, Denver; sales and promotion—John R. Dalsant, Public Service Co. of Colorado, Denver.

The league president, Guy W. Thomas of Public Service Co., announced the appointment of four committee chairmen. They are: Accounting—R. M. Gardner, Southern Colorado Power Co.; adequate wiring—Frank Bendik, Allen B. Carpenter Co., Denver; engineering—J. Y. Parce, Stearns-Roger Mfg. Co., Denver; information—P. J. Kronenberger Jr., Colorado Central Power Co., Englewood.

The league's spring conference will be held April 21-24 at the Shirley-Savoy Hotel in Denver.

♦ Two Public Service Co. employees at Denver rescued four persons who were trapped on the second floor of a burning business and apartment building.

The workmen, A. J. Corazza and Lyle Fitzsimmons, were on their way to repair a street light when they noticed smoke pouring from the building.

They radioed Public Service headquarters to summon firemen, then swung their truck's ladder up to a window where a man and woman were shouting for help. Corazza mounted the ladder and assisted to safety Sam Huerena, his wife Sally, their six-month-old son, Joseph, and Mrs. Mary Vigil.

♦ Colorado Farm Power Council is cooperating this month with the Colorado Agricultural Extension Service in conducting irrigation clinics at Alamosa, La Junta, Sterling and Greeley, all in the center of Colorado farming areas.

A major purpose of the clinics is to explain new irrigation developments, methods, ideas and equipment.

The clinics are scheduled at Alamosa, Feb. 18-19; La Junta, Feb. 21-22; Sterling, Feb. 25-26; and Greeley, Feb. 27-28. The Greeley session will be at the Home Light & Power Co. The other meetings will be at public agencies.

♦ Tax payments by Public Service Co. of Colorado to the city of Denver were nearly double those of the next biggest taxpayer in 1956. Public Service paid $2,169,600 on an assessed valuation of $42,234,780 compared with $1,140,762 paid by Mountain States Telephone & Telegraph Co.

♦ Heating cables for removing snow and ice were installed in a new sidewalk constructed in front of the main office of Home Light & Power Co. at Greeley. There is an aluminum outline of Reddy Kilowatt in the concrete. Herdman Electric Co. installed the heating cables and the figure of Reddy Kilowatt was made by Moffat Paint & Glass Co.

♦ Young Electric & Manufacturing Co. is spreading out in two directions from its Denver headquarters. Sales offices are going to be opened at both Albuquerque, N. M., and Salt Lake City. President W. E. Young says he's considering other expansions, which may be ready to announce in a few months. The firm distributes BullDog electric products in eight states and manufactures switchgear at its Denver plant.

♦ Hamilton Associates, Denver manufacturers' representative for several electrical lines, has added Empire Metal Products Co. of Chicago. Harold Klingenburg reports his firm has the franchise for Empire's strain insulators and other fiber glass products in Colorado, Wyoming and New Mexico.

♦ Warren W. Joy of Joy & Cox Inc. of Denver reports installation of a new 100,000 lb-per-hour steam generator in the municipal power plant at Farmington, N. M. The generator was manufactured by Combustion Engineering Inc., New York. Joy said the unit has a pressurized furnace and a tilting tangential burner, which he called "unusual in a generator that small." It is designed to burn natural gas or fuel oil. The steam is provided at 825 F and 640-lb pressure. It will drive a 7,500-kw turbine.

Pacific Southwest Region

WILLIAM V. O'BRIEN, vice-president and general manager of General Electric Co.'s Apparatus Sales Division, traveled to the West Coast to present a bright electrical picture to southern California businessmen, gathered at the Biltmore Hotel for the Los Angeles Chamber of Commerce 1957 Business Outlook Conference.

He predicted consumption of electricity in the average American home would increase 67% by 1960, jumping from the present average of 2,995 kwh per home to 5,000. While noting that consumption in California homes was below that of the national average, O'Brien added, "I see no reason why you should not be able to exceed the national average in the very near future . . . Thanks to the foresight and aggressive planning of the area's electric utilities and their many trade allies, southern California bids well to become the nation's leader in the industry-wide Live Better . . . *Electrically* program."

♦ William Watson left the Los Angeles office of Ray J. Noel Inc., manufacturing representative for Advance Transformer and others, for San Francisco, where he will serve as Noel's general manager for northern California. He has been with the firm in Los Angeles for the past year and a half as assistant sales manager.

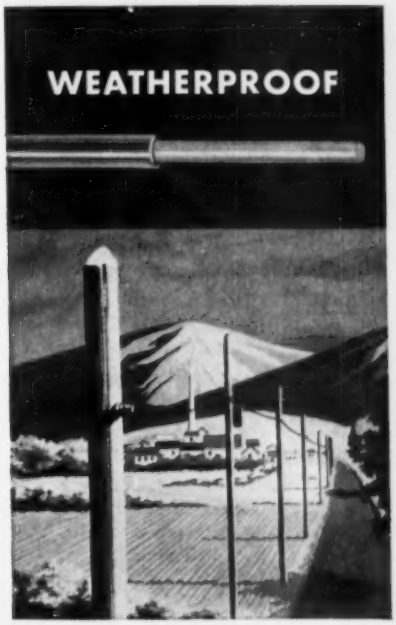
♦ W. B. Bustard joins the Los Angeles staff of H. D. Easterbrook, manufacturing representative for Allen-Bradley and Sorgel Electric companies. Bustard comes to Los Angeles after eight years with Phoenix consulting engineers, Ferguson & Carollo, and previously served with Westinghouse Electric Corp.

♦ Marion Bacot, executive secretary of the Electric Club of Los Angeles, announced the club has set the date of its annual "stag party," for members and their guests, at May 23, in the Breakfast Club.

♦ Electric Club members were introduced, at their Jan. 7th meeting, to Duane Erway, California Institute of Technology student, and winner of the $500 Electric Club scholarship.

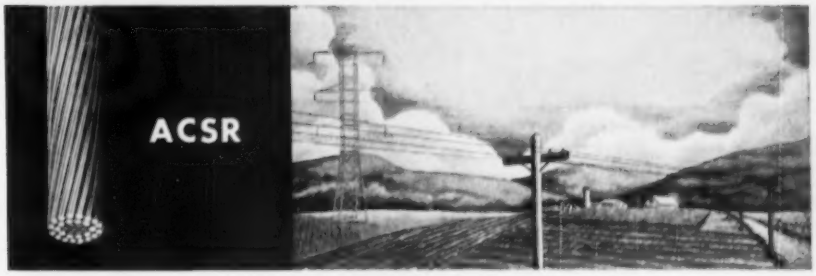
♦ Southern California Edison Co.'s Paul Henrichs will chairman EMEA's fourth annual Electrical Maintenance Conference, scheduled for April 16-18, at the University of Southern California. Those attending will be treated to a banquet, luncheons and two field trips, in addition to a long list of qualified speakers from the maintenance field.

ALECTRAL



GENERAL CABLE'S

ALUMINUM CONDUCTOR



Built into its aluminum products are 75 years of General Cable's engineering and manufacturing experience. In this record are more than 25 years of successful performance of insulated aluminum conductors marketed as ALECTRAL. Available in ALL-ALUMINUM, ACSR, WEATHERPROOF and with RUBBER and THERMOPLASTIC insulations. A sound and economical investment for all voltage ranges.

GENERAL CABLE CORPORATION, 420 Lexington Avenue, New York 17, N. Y.
Offices and Distribution Centers Coast-to-Coast

for quality and service . . . **specify GENERAL CABLE**

THE TIME PROVEN
1929

FOR YEARS...
THE UNCHALLENGED
LEADER IN ITS CLASS

THE PORCELAIN PRODUCTS 1929 WIREHOLDER IS THE "STANDARD", BECAUSE OF:

Good Basic Design √
Sound Engineering √
Uniform High Quality √
Competitive Pricing √
Dependable Service √
Up-to-date Packaging √

Plus a complete, quality line of secondary service materials!

62 Years
Electrical Porcelain Since 1894.
PP INC
Porcelain Products, Inc.
FINDLAY, OHIO

Pacific Northwest Region

FOLKS who heed the electrical industry's plea will Live Better . . . *Electrically* in 1957 and thereafter. First anniversary celebration of the program was through a nation-wide, closed-circuit telecast, Jan. 30, linking group meetings in the principal cities, mostly under power company sponsorship.

This affair is history now but for the record let's put it down that in Portland the show was arranged by Wesley Dunn and Joe Liebrich for Pacific Power & Light and W. L. "Bill" Tate for Portland General Electric. Gordon DeFoe, general sales supervisor for Washington Water Power Co., handled it in Spokane and in Seattle.

The Portland meeting, taking the form of an extended coffee break, invited exhibits emphasizing wiring devices and service entrance equipment intended to bring distributors and dealers up to date on Portland's new code, which took effect Jan. 1.

This code makes a 200-amp meter base and a 2-in. raceway mandatory, so that conductors having 200 amp capacity can be installed. (ELECTRICAL WEST, December 1956, p 91) Joe Gray, chief electrical inspector, says this puts Portland in the vanguard of cities leading the way to adequate provision for the higher residential loads that will prevail when people take advantage of all the ways there are to Live Better . . . *Electrically*. Spokane was first with such a requirement in its code about two years ago.

♦ Thomas Industries Inc. of Los Angeles has established direct factory sales representation in the Northwest through placing Kenneth D. Cummings in Seattle. He will feature the Moe Light and Star Light Divisions of the company in Washington, Oregon and portions of Montana and Idaho. He was the company's representative in San Francisco for seven years. A. O. Grotenhuis, Western sales manager, visited the Northwest in January, calling on his wholesaler outlets with Cummings.

♦ Dudley D. Moore, for the past three years district representative in Oregon for Benjamin Electric Mfg. Co., has joined Sverdrup & Parcel, consulting engineers of San Francisco, as electrical engineer.

♦ Montana Power Co. has a new purchasing agent as of Jan. 1, Roger A. Hofacker . . . And Portland General Electric has a new "Hole-in-Oner" as of about the same date, Frank A. Warren Jr. Warren is better known as a utility executive, however, than as a golfer, being president of the company.

♦ Completion of a major tie line, 115 kv, between Astoria at the mouth of the Columbia River and Tillamook, some 75 miles south on the Oregon Coast, was made the occasion for a neat public relations gesture by Pacific Power & Light Co.

Vehicle was a lunch for public officials and prominent citizens or, more precisely, three separate lunches in the three key towns on the route of the line, held simultaneously and tied together for program purposes by the ever present and ever ready Pacific Tel. & Tel.

Robert Gordon, power company district manager in Tillamook, was the chief MC and George T. Bragg, vice-president and general manager, made the principal speech at that

Ken House, with pointer, and J. Coleman Jones pictured at Seaside luncheon meeting.

CHECK THESE "SPECS"

Constructed of more die-formed parts than almost any other fixture of its type for rugged performance.

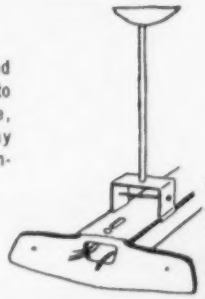
For general lighting the SIXTEEN-EIGHTY is unsurpassed for efficient long-term lighting economy.

Double acting positive spring clips retain side panels firmly to prevent rattling and to allow simple snap-in replacement.

An advanced concept of lighting comfort . . . the Sunbeam SIXTEEN-EIGHTY series has been critically engineered for the ultimate in universal application and lighting comfort.

Extruded metal rail reinforced plastic side panel to insure freedom from warpage or accidental breakage while enhancing design appearance.

Heavy gauge, die-formed end plates rigidly held to main channel. Large, smooth-edged wireway opening permits fast continuous row mounting.



For increased flexibility and ease of installation, die-formed channel accommodates sliding clamp hangers. No connectors required for continuous rows.

Translucent white plastic side panels of light stable Dow virgin #647 Styron are ribbed and contoured for architectural appeal. A 10° slant helps maintain longer lasting high efficiency and contributes to better brightness control from normal viewing angles.

CBM certified, ETL tested and UL approved parts.

90% reflectance durable baked white enamel "blends" with most contemporary ceilings.

The SIXTEEN-EIGHTY: it's easy to see by

Shielding assembly automatically disengages by means of spring-loaded latches and remains suspended from channel by jack chain for quick accessibility.

Surface or pendant mounted by use of nearly universal knockouts and sliding clamp channel.

Exacting photometric control achieves extremely high efficiency (up to 87%) with a controlled distribution of approximately 60% up and 40% down, a brightness of less than 1 c/in² within the shielded zone.

Rigidly constructed, vibration-free interlocked louver provides high, comfortable shielding of 35° x 35°—better than most school requirements.

Engineered for maximum heat dissipation for longer ballast life.

Bonderized for long-lasting corrosion resistance and tough paint adherence.

SUNBEAM LIGHTING COMPANY

777 East 14th Place, Los Angeles 21, California

For technical information on this advanced concept of lighting, write for bulletin F-2.

SURGICAL LINE CLEARANCE BY DAVEY

Davey is doing line clearing for 12 Public Utilities on the Pacific Coast —most of them served continuously for over 20 years. Davey specialized equipment and efficient methods save money . . . Davey surgical pruning benefits trees—builds goodwill.

DAVEY LINE CLEARING
DIVISION OF
DAVEY TREE SURGERY CO., LTD. OF CALIFORNIA
Russ Bldg., San Francisco, SUtter 1-3377
Story Bldg., Los Angeles, TUcker 1929

Amazing New Fish Tape Leader for Hand Tapes

BARTH SNAKE CHARMER

HIGHEST QUALITY—MOST DURABLE
EASIEST TO USE FISH TAPE LEADER ON THE MARKET!

- makes it easy to push tape in all runs.
- tapered for easy pushing around elbows. Promotes correct twist at reverse elbows. Ends binding and jamming.

See the New Barth Snake Charmer at your Electrical Distributor's now.

From the maker of the famous Barth Electric Cable Puller.

THE BARTH CORPORATION 12663 Brookpark Rd., Cleveland 30, Ohio

point. His talk and comments by various mayors, state legislators and other citizens were heard at all three luncheon spots over the long distance conference tie-up.

Arthur S. Dempsie, manager of the Clatsop district at Astoria, and his local manager at Seaside, K. A. "Ken" House, did the honors in their respective towns. J. Coleman Jones, general superintendent, and Zed Merrill of the company's advertising department from Portland, attended the Seaside meeting, as did the writer (Berk Snow).

♦ Aaron B. Cayo, 45 years with Portland GE, superintendent of distribution since 1948, retired Dec. 31 and went to San Rafael, Calif., to live . . . Ed A. Woodhead, with Idaho Power Co. since the mind of man runneth not to the contrary and presently consulting engineer on the Snake River projects in the Hells Canyon reach of the river, received his 50-year diamond service pin at Brownlee site in October, and remained on the job. . . . J. D. Lewis, once and for a long time Washington Water Power's division manager at Pullman, then retired, then Ebasco's division manager somewhere in Greece, is now back at Pullman running a territorial division of Kiwanis, running a local campaign for associated charities, and ran for the Washington legislature (he was defeated). What a way to retire!

♦ *Incidental intelligence from Arch Cape*—This community is 14 miles south of Seaside on U. S. Highway 101. We have a new supermarket here 35x32 (well, that's super for Arch Cape) run by Mrs. LeGault. It's the principal competitor of Harley Sroufe's fine grocery in Cannon Beach, five miles north. Harley used to be with National Electrical Products. His father, Harry, founder of Jagger-Sroufe in Portland in 1916, oldest existing firm name in Northwest electrical contracting, lives in Cannon Beach.

Another Sroufe we see here occasionally is Ralph, presently executive vice-president of Stubbs Electric, Portland.

Fred Zaugg, one of the founders of the Portland Electric Club, retired from Smoot-Holman Co. of Englewood, Calif., last year and came down to Cannon Beach to live.

Carl Bressie of Bressie Electric Co., Portland, has a summer place at Arch Cape. At this writing, Jan. 14, just before deadline, the sun is shining brightly. Electrical industry folk take notice—this is Oregon's banana belt.

Now!
ADVANCE FLUORESCENT LAMP BALLAST
CAT. NO. SEQM-240-S
CBM CERTIFIED
FOR TWO 48". T-12, 38W SLIMLINE LAMPS OR
FOR TWO 48". T-12, 40W INSTANT START LAMPS OR
FOR TWO 60". T-17, 40W INSTANT START LAMPS
118 VOLTS • 60 CYCLE • 430 M.A.
ADVANCE TRANSFORMER CO.

ADVANCE FLUORESCENT LAMP BALLASTS INDIVIDUALLY PACKAGED

Yes, now ADVANCE Quality Fluorescent Lamp Ballasts packaged in modern individual cartons are available from your authorized ADVANCE Distributor. These individually packaged ADVANCE Fluorescent Lamp Ballasts put an end to loose dangling lead wires, prevent damage to lead wire and assure you of factory fresh ballast stock always. End labels on the new individual cartons permit instant identification of ballast type, catalog number and pertinent electrical characteristics.

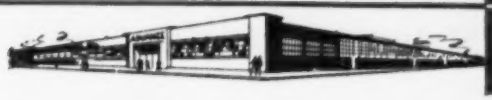
Your authorized distributor carries a complete stock of all popular ADVANCE ballasts to give immediate replacement service for any make fluorescent lamp ballast whenever replacement is necessary. Simply bring the inoperative ballast to any ADVANCE Service-Stocking Distributor. The ADVANCE cross-reference guide shows at a glance the replacement needed, and in a few moments, you can be back on the job with the correct ballast.

To give better customer service, save time and effort . . . insist on quality ADVANCE Fluorescent Lamp Ballasts in the new modern individual cartons.

For further details on how you can increase your ballast sales with ADVANCE Fluorescent Lamp Ballasts in modern individual cartons, contact your ADVANCE salesman, or write, phone or wire today.

ALL HPF BALLASTS CARRYING THE ADVANCE LABEL ARE DESIGNED TO CONFORM TO CBM SPECIFICATIONS

The Heart of the Lighting Industry



ADVANCE

CBM CERTIFIED

World's Largest Exclusive Manufacturer of Fluorescent Lamp Ballasts

TRANSFORMER CO.

2950 NO. WESTERN AVE. CHICAGO 18, ILL. U.S.A.

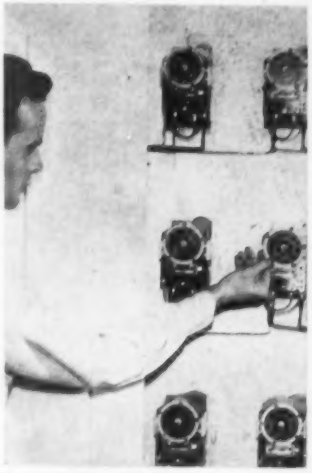
PRODUCT NEWS

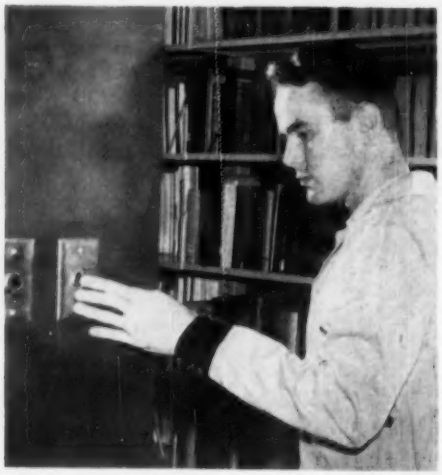
New Designs and Applications

Two Thermostats

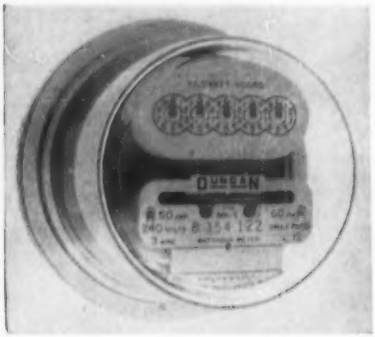
(1) *Minneapolis-Honeywell Regulator Co., 2753 4th Ave. S., Minneapolis, Minn.*

Two new line voltage thermostats have been developed to take the hot peaks and cold valleys out of electric heating, the manufacturer reports. One does it by fast cycling (up to 20 times per hour), the other by cycling only three to six times per hour. The fast cycle unit is designed for low mass, quick heating-quick cooling; the second is for large mass, slow heating-slow cooling systems such as ceiling and floor cable heating applications. Both operate without supplemental relays or transformers.





Tork time switches are automatically policing the lighting in a new student library on the Carleton College campus at Northfield, Minn. Turning lights out in book-stack bays is a nuisance chore at library closing times, and Carleton's library closes three times daily. With the automatic time switches, the bay lights are turned on when needed, and in 12 minutes (or any set time) they automatically go off again.



Class 200 Meter

(2) *Duncan Electric Co. Inc., Lafayette, Ind.*

Capacity for measuring loads to 200 amp with "straight line" accuracy is reported about this new single-phase watt-hour meter. The new meter supersedes Duncan's type MF-SE.

Thermostat-Switch

(3) *Wesix Electric Heater Co., 390 First St., San Francisco 5, Calif.*

A new combined thermostat and switch offered by this company is said to provide sensitive direct control of electric heating cable, non-automatic heaters, duct heaters and other units. It is rated at 25 amp, 240 v with a range of 55° to 85°, and is sensitive to a temperature change of plus or minus 1°, the manufacturer reports.

Cable Brush

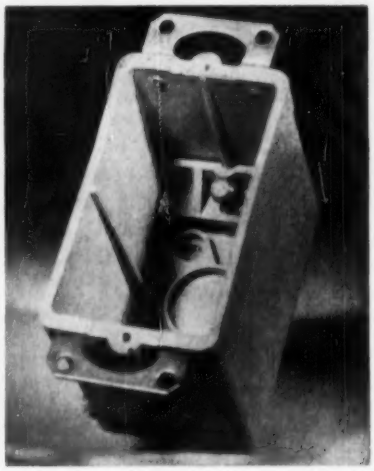
(4) *The Eraser Co. Inc., 1068 S. Clinton St., Syracuse 4, N. Y.*

Specially bonded glass fibers make up a new brush for use in preparing the contact surfaces of aluminum conductor for connections. The two types available from this company are a pencil type for small areas and a tape-wound brush for larger area cleaning.

Heat and Light Unit

(5) *Electriglas Corp., Bergenfield, N. J.*

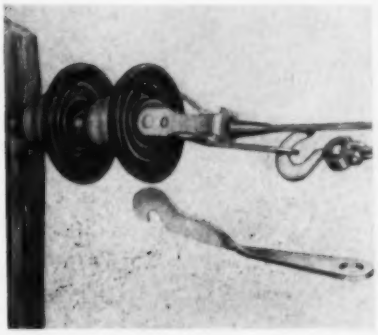
Infrared radiation is applied to this bathroom fixture to provide both light and heat. Besides the heating qualities of infrared, the unit is said to give 150 w of indirect lighting that is comfortable to the eye. Controlled automatically by thermostat independently from the remainder of the house.



Plastic Switch Box

(6) *Porcelain Products Inc., Findlay, Ohio*

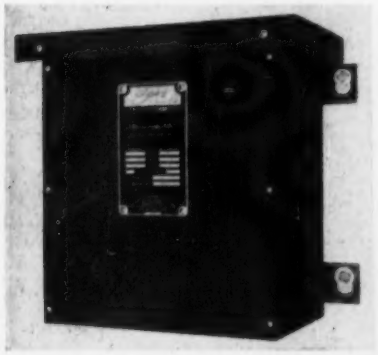
A new addition to this company's fiber glass reinforced plastic boxes is a switch box that can be supplied as a utility box. Corrosion resistance and self-insulating qualities are inherent because of the plastic material. Supplied as a utility box, the box has mounting ears for replacement application or hanger brackets for new work.



Wire-Puller Hook

(7) *A. B. Chance Co., 210 N. Allen St., Centralia, Mo.*

This new wire-puller hook holds the insulator and dead-end assembly directly in line with the conductor, eliminating the need to hold the insulators up with an insulator fork for inserting wire into the automatic dead-end. A hook on one end of the tool hooks to the clevis bolt as shown.



Distribution Transformers

(8) *Strong Electric Corp., 125 City Park Ave., Toledo 1, Ohio*

More nearly weatherproof dry-type distribution transformers for indoor or sheltered outdoor applications are offered by this manufacturer. The transformers are designed for installations where high ambient temperatures or high humidity exist. Models available with 2-, 3-, 5- and 7-kva ratings.

Smaller Safety Switch

(9) *Circuit Protective Devices Department, General Electric Co., Plainville, Conn.*

A new 30-amp, 600-v safety switch that uses 50% less installation space has been introduced by this manufacturer. It is 7⅜-in. wide by 9⅜-in. high by 5⅜-in. deep, and is available in heavy- and normal-duty models and NEMA type 12 enclosures.

Circuit Breaker

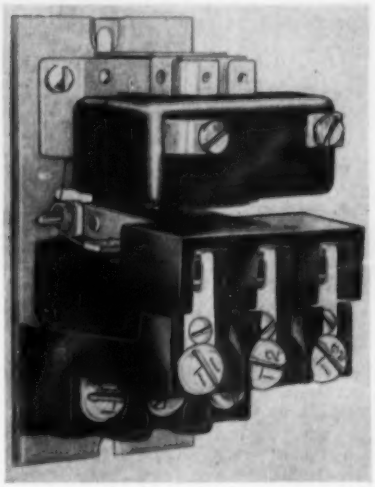
(10) *General Electric Co., Circuit Protective Devices Department, Plainville, Conn.*

A new 800-amp molded-case circuit breaker developed by this company is said to be 6½ in. shorter than conventional breakers of the same rating. It covers applications now using M-, L- and KL-frame sizes. One frame size can be used for all ratings from 125 through 800 amp, with savings in space occurring in ratings above 400 amp. Available in two- and three-pole designs.

Service Entrance Unit

(11) *Circuit Protective Devices Department, General Electric Co., Plainville, Conn.*

A meter socket and load center combination announced by this company is designed to bridge the gap between 50- and 100-amp service entrance equipment. The combination unit is rated 70 amp to provide a "middle ground" and savings to contractors. The unit has space for 14 single-pole circuits, including capacity for up to three double-pole branches to feed 240-v appliances.



Magnetic Relay

(12) *Arrow-Hart & Hegeman Electric Co., 103 Hawthorn St., Hartford 6, Conn.*

A 20-amp magnetic relay suitable for all types of fractional and integral horsepower motors is announced by this company. The manufacturer says the relay can be used with 80% of all residential central air conditioning units. It is also expected to find wide application in commercial and industrial heating situations.

Insulated Bushing

(13) *Line Material Co., 700 W. Michigan St., Milwaukee 1, Wis.*

A phenolic cap covers all exposed live parts of transformer bushings made by this company. The protection is said to help eliminate outages caused by birds and animals, and increase safety for linemen.

Protective Fabric

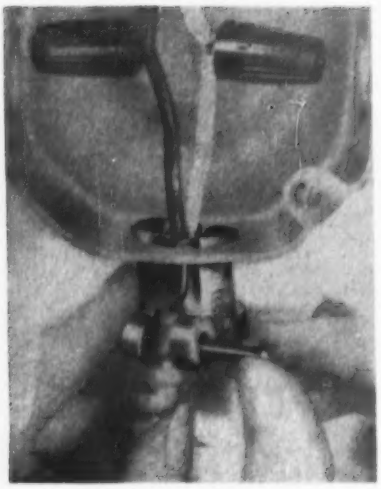
(14) *Herculite Protective Fabrics Inc., 140 Little St., Belleville 9, N. J.*

This new nylon and plastic fabric is reportedly being used as protective covering for equipment, linemen's aerial tents, etc., with success. It is said to be lightweight, 100% waterproof, unaffected by acids, grease oil, industrial smoke and salt water.

Enclosure Hubs

(15) *Federal Pacific Electric Co., 50 Paris St., Newark, N. J.*

Interchangeable raintight hubs, suitable for enclosures for safety switches, Stab-lok circuit breakers and fusible service equipment have been announced by this company. They are designed to eliminate need for conduit or nipple offsets when NEMA III enclosures are used and hub requirement does not exceed 2 in. Available in five sizes from ¾ through 2 in.



Connector

(16) *Unimatic Corp., RFD 1, Caldwell, N. J.*

A new 3/8-in. straight connector for attaching armored cable to standard knockout boxes features simple, quick installation with no washers, wrenches or lock nuts. Made of die-cast aluminum alloy, they are available in 45° and 90° models, too. Said to be especially valuable in applications where vibration is a problem.

Service Wedge Clamps

(17) *Reliable Electric Co., 3145 Carroll Ave., Chicago 12, Ill.*

Addition of an intermediate line of service wedge clamps by this manufacturer is said to fill out necessary sizes to cover the entire range of power applications. The new line takes a range from .400 to .250.

Solderless Lugs

(18) *O.Z. Electrical Mfg. Corp., 262 Bond St., Brooklyn, N. Y.*

This new line of solderless lugs has single-, double- and triple-barrel models, and in one-, two- and four-hole mounting styles.

Switch Tester

(19) *Doyle Design & Machine Co., 51-57 Scio St., Rochester 4, N. Y.*

Production is just starting on this device, which is designed to indicate the electrical condition of a switch in relation to the mechanical position. Application of the device is said to be desirable in connection with machines controlled by precision, snap-action switches. A neon lamp indicates whether the switch is open or closed. Necessary wires for installation are attached.

Photocopy Unit

(20) *Peerless Photo Products Inc., Shoreham, L. I., N. Y.*

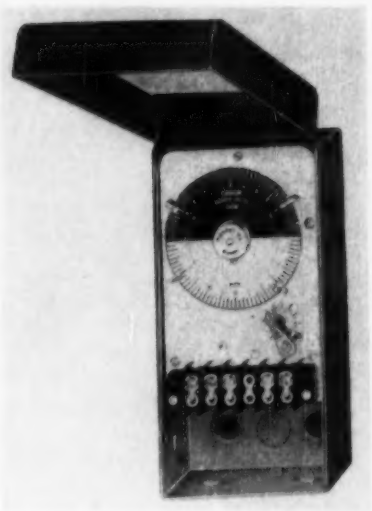
Taking less space than a standard electric typewriter, this new photocopy machine is said to be the smallest and most inexpensive ever offered. It will handle copying jobs up to 9 in. wide, and makes black and white copies of pencil, ink or printed source material, including halftone cuts.

Tower Paint

(21) *James B. Sipe & Co., Industrial Division, Box 8010, Pittsburgh 16, Pa.*

Tower Finish Grey No. 280 is a new, one-coat, corrosion-resistant paint for transmission towers and structural-steel framework in substations and switchyards. Cost of the paint is said to be little more than half that of comparable finishes. The company reports that tests show the paint can endure about eight years of exposure without apparent deterioration.

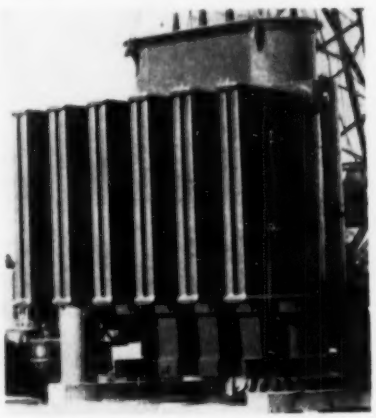
Fill in coupon on page 28



Time Switch

(22) *International Register Co., 2624 W. Washington Blvd., Chicago 12, Ill.*

Two electrical circuits can be controlled at different times by a time switch introduced by this manufacturer. The series of switches permits varying timing periods from 30 minutes to 23½ hours, and will accommodate 24 sets of on-off trippers.



Transformer Line

(23) *Marcus Transformer Co., Rahway, N. J.*

Features of this new line of transformers include an element wound on a core of grain oriented steel, which is a size reduction measure. Coils are continuous double disk wound to eliminate internal brazing and internal hot spots. Vacuum impregnated coils are immersed in triple filtered high dielectric oil. The first production model was rated 3,000-kva, Class OA, 55 C rise, three phase, 60 cycle, 13,200 v.

GEDNEY'S RIGHT THERE IN YOUR CORNER

helping save time . . . hold down costs

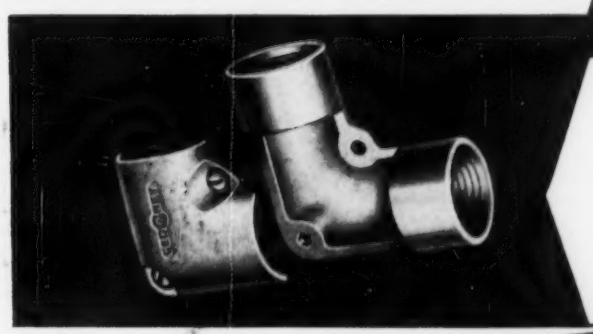
CORNER FITTINGS? Well, here are three that have proved immensely popular for the simple reason they're easiest to install—save time and labor that really counts up. Like the rest of the full Gedney line they're made of unbreakable malleable iron...accurately machined and threaded . . . individually inspected. Order Gedney—always—for lowest installed costs!

90° CORNER ELLS

Fitted with gasketed cover. Both ends female. Made of malleable iron, cadmium plated. Available in a full range of sizes from ½" to 2".

90° CORNER ADAPTERS

Fitted with gasketed cover. One end male, one end female. Made of malleable iron, cadmium plated. Your choice of sizes from ½" to 2".



CORNER PULL-IN CONDUIT ELLS

Today's top specification for space-saving, machine wiring, easy wire pulling. Malleable iron, cadmium plated. Sizes run from ½" to 2".

GEDNEY FITTINGS FIT

GEDNEY
ELECTRIC COMPANY

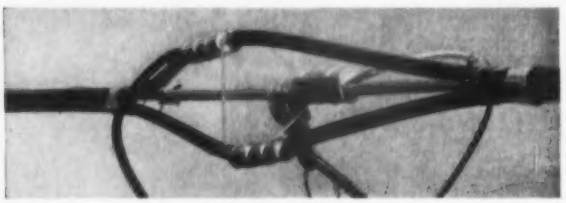
GEDNEY

RKO BLDG. • RADIO CITY • NEW YORK 20
Foundry, Factory and Shipping Point: Terryville, Conn.

High-Speed Circuit Breaker

(24) *Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.*

A 5-kv magnetic circuit breaker developed by this company has a two-cycle interrupting time. Designed for use with 4.16-kv distribution systems, the high-speed unit is said to have an interrupting capacity of 30,000 amp and can be applied where conventional 150-mva circuit breakers are now used. It is a 600-amp unit. Closing current is about 90 amp; trip current 25 amp.



Secondary Cable Spacer

(25) *Secondary Cable Spacer Co., 219 Federal Lane, Eugene, Ore.*

A triangular plastic cable spacer now available is said to save time and expense in making midspan taps on secondary cable. Use of the spacer is said to eliminate the need for special rubber tape, resulting in the savings of one-third to one-half the material expense.

ELECTRICAL WEST *Not good*
68 Post St., San Francisco 4, Calif. *after April 1*

Please send me, without obligation, the new product information or catalogs.

If described in Product News, circle item number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27 28

If described in advertising, fill in page number

☐☐☐ ☐☐☐ ☐☐☐
☐☐☐ ☐☐☐ ☐☐☐

NAME ..... TITLE .....

COMPANY .....

ADDRESS .....

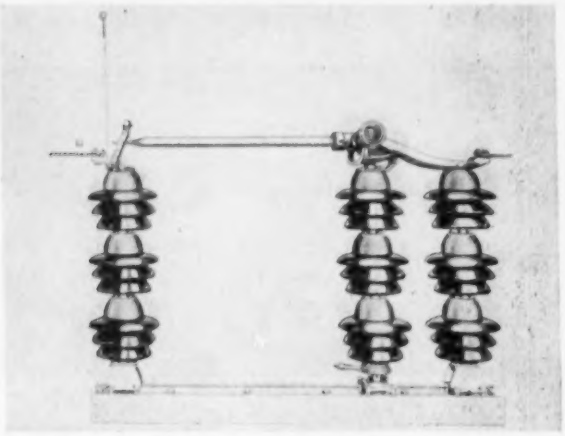
CITY ..... ZONE .... STATE .....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Time Switch

(26) *Tork Clock Co., 1 Grove St., Mount Vernon, N. Y.*

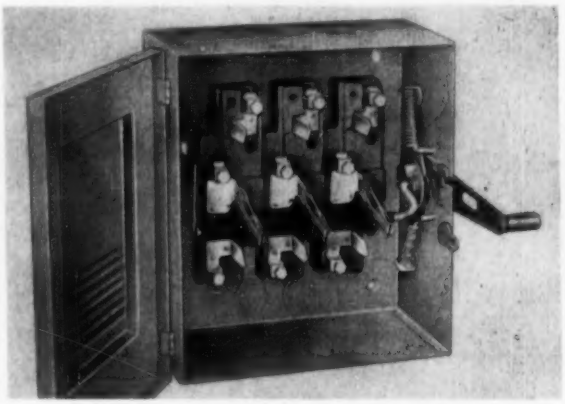
Controlling three-phase power and lighting loads is the function of this redesigned three-pole time switch. It is available in four dial styles: 24-hour, skip-a-day, astronomic and seven-day. The Tork 1963 is said to be the first time switch that can be used to control a 1½-hp, three-phase motor directly.



Vertical Break Switches

(27) *Line Material Co., 700 W. Michigan St., Milwaukee 1, Wis.*

Both 600- and 1,200-amp ratings are available in this new line of 115-kv vertical break switches. They are available for outdoor group operation in horizontal, vertical or inverted mounting position. Recommended for sectionalizing, disconnecting and by-passing applications by the manufacturer.



Industrial Safety Switches

(28) *Federal Pacific Electric Co., 50 Paris St., Newark, N. J.*

A new line of industrial double-throw safety switches for 240/600-v a-c or 250-v d-c service is announced by this manufacturer. Features include a quick make-break mechanism that reduces arcing and lengthens blade life; silver plated current carrying parts; visible dual blade construction and others.

Dispatchers of Northern States Power Company in Minneapolis have a running picture of load conditions across the company's 40,000 square mile area. Bell System private line channels carry data fast and accurately from all over the system to the operations center.

How Bell System communications serve the power industry

Modern communications help Northern States make profitable use of a million-KW capacity

Bell System private line channels tie the power networks serving homes and industries in 527 upper Midwest communities to the new system operations center of Northern States Power Company in Minneapolis.

The slightest fluctuation in output, increase in load, or the first signs of bad weather are transmitted directly to the center, giving NSP dispatchers plenty of time to adjust spinning reserve capacity.

Bell System channels for telemetering, and supervisory control (which permits remote control of generation from the center), form the nerve system that lets NSP give efficient, economical power and light to 2,000,000 people.

Your Bell Telephone representative is your best source of ideas on how to streamline your own communications. He will be glad to study your needs. Call him at your local Bell Telephone business office.

BELL TELEPHONE SYSTEM

PRIVATE LINE TELEPHONE • PRIVATE LINE TELETYPEWRITER
CHANNELS FOR: DATA TRANSMISSION • TELEMETERING
REMOTE CONTROL • TELEPHOTOGRAPH • CLOSED CIRCUIT TV

FORGED CRITICAL PARTS *keep today's cars moving . . .*

FORGED STRAIN CLAMPS *keep power moving too!*

63 DROP FORGINGS . . .

go into the average automobile—with all but 4 of these in the critical steering assembly, engine, and power train. The use of forgings eliminates premature failure of key members where fatigue and impact stresses are concentrated and heavy wear occurs. In today's cars the achievement of more power and greater speed demands forged steel components possessing high strength while reducing overall weight.

IT PAYS TO SPECIFY FORGINGS for your transmission lines. Take strain and angle construction, for instance. Because BTC Strain Clamps are drop-forged, they offer a completely dependable, efficient means of dead-ending conductors.

The general design of these Clamps combines the strength, toughness and lightweight of forgings with a considerable reduction of the factors causing conductor-vibration-fatigue damage. Slip strengths are more than adequate. Designed for all conductors in general use, BTC Strain Clamps are suitable for all classes of dead end construction, all line current loads and voltages and all conditions of atmospheric corrosion. They are easy and economical to install —no special tools required. The conductor may be strung between Clamps, or from Clamp to Apparatus, without cutting or splicing, insuring permanently trouble-free operation.

Choose the right Clamp for your conductor from the BTC line. You'll find BTC Conductor Strain Clamps available in a wide range of sizes.

5000 SERIES

Steel Strain Clamps. Drop-forged steel, hot-dip galvanized, suitable for all conductors. May also be ordered with Aluminum or Copper Liners.

5200 SERIES

M.P.L. (Minimum Power Loss) Aluminum Strain Clamps. Drop-forged, heat-treated Aluminum Alloy Clamps for A.C.S.R. and All-Aluminum Conductors.

Specify BTC **DROP-FORGED Hi-Line Hardware**

. . . from your Insulator Manufacturer

The BREWER-TITCHENER CORPORATION, Cortland, N. Y.

Hotpoint Electric Ranges

women-tested features that build sales...load...revenue!

- "Fashion-Front" Styling
- Colortones
- Color-Lighted Pushbuttons
- Two-Way Super-Matic—Choice of 6" or 8" Unit
- Automatic Time Control of All Surface Units
- Musical Meat Thermometer
- 1½ Gallon Coffee-Perk
- Super Fast "Super 2600" Calrod® Unit • Silver Grey Ovens
- All-Calrod—Surface *and* Oven
- Rota-Grill Rotisserie
- Handi-Over Grill
- Handi-Raise Broiler
- Golden Griddle • Thrift Cooker
- Automatic Reset Oven Timer

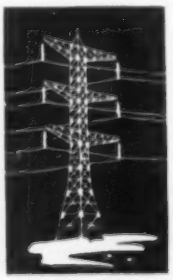
HELPING YOU SHAPE THE BIGGEST TOMORROW...EVER!

Here's the Electric Range that puts more *salespower* behind "HOUSEPOWER," more *living* in "LIVE BETTER . . . Electrically"! That's because Hotpoint made hundreds of studies to determine what your women customers want in an electric range—then designed models and features to specifically meet those demands!

Let Hotpoint Automatic Electric Ranges help you shape the biggest tomorrow—*ever!* Hotpoint's women-tested features offer the shortest distance between the sales floor and more electric ranges on your lines. And, when Hotpoint's hard-hitting national advertising and imaginative sales-promotion are tied-in with the "HOUSEPOWER" and "L.B.E." programs, you can boost your electric range sales, load and revenue to more profitable levels.

Have your Hotpoint Distributor show you the *complete* Hotpoint Range Line for '57 . . . 6 NEW 39-inch models and 3 NEW 30-inch models!

Again, Hotpoint



LIVE BETTER ELECTRICALLY

looks at Tomorrow, Today!

HOTPOINT CO. *(A Division of General Electric Company)* ***5600 Taylor Street, Chicago 44, Illinois***

FEBRUARY 1957

ELECTRICAL WEST SALES GUIDE News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

Prize drawing

As a part of the National Electrical Week celebration, Feb. 10-16, Northern California Electrical Bureau will invite all PG and E electric customers to go to dealer stores, pick out the appliance they want most—and perhaps win it. Applying to major appliances and housewares, the $20,000 prize drawing will build up dealer prospect lists. A similar promotion during Lights Diamond Jubilee in 1954 brought more than 106,000 people into dealer stores to record their most wanted appliance; resulted in sales of more than $1,000,000 worth of electrical merchandise. Getting its start during Electrical Week, the promotion will continue to March 11.

Luncheon celebration

San Diego will celebrate National Electrical Week with an all- industry luncheon meeting on Feb. 11, sponsored by the Bureau of Home Appliances, San Diego Gas & Electric, and the Electric Club. It will be headed by Bob Kinslow, Electric Club president, and Ed Nystrom, bureau president.

Financing plan popular

Pacific Power & Light is continuing its promotion of residential wiring through its financing plan for the customer. Wes Dunn, who heads the activity, says the number taking advantage of the plan has greatly exceeded expectations.

Prize Parade

Portland General Electric's principal promotion recently has been the "56 in '56 Prize Parade" carried on by Bill Tate, appliance sales promotion manager. In this program dealer salesmen were granted points for every range or dryer sale —points that had a money value on merchandise purchased from local distributors. Campaign started in September and when it closed, 56 days later, the company paid off on 3,451 electric dryers and 2,042 electric ranges. Some 275 salesmen in about 170 electrical dealer stores took advantage of this opportunity.

Two out of three firsts

Portland won two top national awards in the 1956 Electri-Living home building program. PGE took the first prize for utility cosponsors and will receive its trophy at the Chicago Adequate Wiring conference. Builder Jack Nunn won top prize for construction, merchandising and promotion.

A First

Year's end at Spokane found Gordon DeFoe, Washington Water Power's general sales supervisor, setting sales quotas on dryers, automatic washers, water heater conversions and electric heat promotion. The last is a new promotion and probably a "first" in the Northwest. "Hotter Than Blue Blazes" is the name of the drive. As just one phase of its 1956 activity the company changed over 1,134 low-wattage water heaters to the quick recovery type.

Moves up

Frank Reis moved up at PP&L to general sales manager, when Roy Vernstrom became assistant general manager...At PGE Carrol Brissenden, general sales manager, has a new assistant, Leo Chaffin. Chaffin is Portland Junior Chamber president this year.

Winter date set at San Diego

San Diego Bureau will hold its Winter Conference on March 7. Bill Marsden is general chairman. The bureau has started its laundry equipment campaign; is making available 10,000 copies of the booklet Weatherguide for free public distribution.

Adds line

J. N. Ceazan, which recently acquired the Easy and Gibson lines, has taken on the Olympic Radio and TV distributorship, including some American and German-made hi-fi units. Olympic, headquartered at Long Island City, N.Y., has closed its Los Angeles factory branch, Olympic of Southern California. No change in dealer organization is planned though there may be some additions. The company has launched a special bonus arrangement with Easy and Gibson dealers to run from Jan. 1 to June 30 on all 1957 items. This replaces an earlier plan for a dealer contest.

Refrigerated units, too

Wright Mfg. Co., Phoenix, will begin full production of refrigerated air conditioning units this year. Formerly Wright made evaporative units only. Production of refrigerated units will be at a new 37,460-sq-ft building in Phoenix with evaporative production continuing at the company's five-acre plant. President Jay Wright said the new units will include four different types of self-contained package units and four types of remote-control units in vertical and horizontal styles.

Settled

G-E employees at the Housewares and Radio Receivers Division sales and service center in Los Angeles are well settled in their new and colorful 22,500 sq-ft building. Formerly at four locations, operations are now consolidated at 2800 Beverly Blvd., J. R. Wilson, service manager for the centers, reports.

Portables have department

Because it believes small appliances need more attention, McCollum-Law Corp. of Denver, Westinghouse distributor for Colorado, part of Wyoming and New Mexico, has set up a new department with the title, Department of Portable Appli-

ances,Radios and Westinghouse Specialties. Joe Noris, for three years major appliance manager for northern Colorado, was appointed sales manager for the new department.

Changes at Frigidaire

William I. Buchanan, northern California branch manager of Frigidaire Sales Corp., a familiar figure at industry meetings and missed of late months during his illness, died Jan. 3. Changes made in the Frigidaire organization as a result: William F. Cronin has been made branch manager; Gilbert F. Hamilton, appliance sales manager; C. R. ""Rich'' Birkholm, San Francisco division manager; James H. McKenna, sales promotion manager. Cronin has been with the Oakland branch since February 1946 and was appliance sales manager for 4½ years. Hamilton steps up from San Francisco manager; Birkholm from sales promotion manager.

Appointments

Perfection Industries Division has appointed eight wholesale distributors to handle its line. Those in the West: W. F. Distributing Co., Denver, headed by F. N. Mabee, president, Rocco J. Ursini, sales manager; Twin Falls Plumbing Supply Co., Twin Falls, Idaho, headed by Fred Abbott, president.

New dealers

Spartan Division of Magnavox has announced new dealer appointments including F. C. Nash & Co., Pasadena; Thompson's Furniture Co., Bellflower, Calif.; Jackson Furniture Co., Oakland.

Heads list

W. J. Lancaster Co., San Francisco, with eight winners, led all distributors in the Norge contest for "perfecting dealer coverage". They received Nassau vacations.

Show line

Appliance open house was held by California Electric Supply at the San Francisco Merchandise Mart last month to show the new Philco line. California Electric, a 50-year-old firm, is exclusive northern California distributor for Philco consumer products following the Bendix purchase. E. L. McDonnell is president; T. Rising, manager of the appliance division.

Merger

Assets of the Thomas A. Edison Co. have been transferred to the new McGraw-Edison Co. Max McGraw is president of the firm. Henry G. Riter continues as head of the Thomas A. Edison Industries.

New set-up

Taylor Distributing Co. of Spokane will distribute Kelvinator and Leonard products in the Inland Empire area. Kelvinator's zone office at Seattle, which has serviced the region, will continue to operate in western Washington and Oregon. Ralph Ford, vice-president and general manager, heads the Spokane firm, a branch of Taylor Distributing Co. of Billings, a long-time Kelvinator distributor.

Frank Falge's monthly progress report on

LIVE BETTER . . . *Electrically*

State sets pace with 7,909 kwh

Washington State reports that people Lived Better... Electrically in 1956 with 7,909 kwh average use per residence—an increase of 457 kwh over the previous year. No utility reported less than 7,100 kwh average use. Three utilities reported above the 10,000-kwh level. However, the greatest use was reported by Tillamook Public Utility District in Oregon, 16,200 kwh with better than 90% saturation of ranges and water heaters.

It's not the heat

Mildewed clothes are costly because they require frequent cleaning. Damp-Chaser Inc., 1440 Ridgewood Blvd., Hendersonville, N. C., now makes a 24- or 36-in. unit that plugs in any outlet and changes the air in a closet 150 times daily. It also makes a small unit for chasing the moisture out of fine pianos, hi-fi and so forth.

Something new in flashlights

A rechargeable flashlight called Charge-A-Lite is now on the market by Remington-Rand Electric Shaver, division of Sperry Rand Corp. It has a prong connection on one end and all you do is plug it into an electrical outlet for recharging. It carries a built-in storage battery and recharger. Another new device to help you Live Better...Electrically.

Babies Live Better Electrically too

Radiant Products Inc., Monroe, N. C., has put on the market two devices that should make the baby and you very happy—a play pen pad to keep babies warm and a Kozy floor mat available in five sizes to use any place in the house to keep you warm and comfortable.

This radiant heat not wanted

Picture windows are great but frequently have to be closed to keep out sun. Now this can be done easily and electrically with a compact automatic unit that is simple to install behind drapery and plugs in. It is made by Electro-Traverse Corp., 1011 S. Western Ave., Los Angeles 6, Calif.

PG and E sets high score

Pacific Gas and Electric Co. customers entered the 1956 Housepower contest to the tune of 32,324 entries, or more than 10% of the U. S. total of 316,771. This was the highest for any of the 160 participating companies. Over 30 communities in northern California now provide for safe, modern electrical living with 100-amp service requirements. At least two areas, Spokane and Portland, require 200-amp service.

HOUSEPOWER

FOR COMPLETE SATISFACTION AND SAFETY

APPLETON

INDUSTRY'S MOST ADVANCED LINE

EXPLOSION-PROOF EQUIPMENT

JUNCTION UNILETS

LIGHTING FIXTURES

RECEPTACLES

SWITCHES

Explosion-proof electrical equipment is more important today than ever before. Manufacturers of material handling equipment are adding explosion-proof switches and connectors to be used in hazardous areas. And, an ever increasing number of industrial plants are almost entirely equipped with explosion-proof electrical equipment. Appleton's full line of explosion-proof electrical equipment is the result of extensive laboratory development and field tests, with your individual safety requirements in mind. Proven acceptance and use by leading companies the world over is your assurance that APPLETON is.

TODAY, MORE THAN EVER...

The Standard for Better Wiring®

LINE STARTER UNILETS

FLEXIBLE COUPLINGS

EXPANSION UNIONS

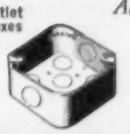
CIRCUIT BREAKER UNILETS

Sold Exclusively Through Selected Wholesalers

APPLETON ELECTRIC - PRODUCTS ®

Also Manufacturers of

Industrial Lighting



Outlet Boxes

"ST" Series Connectors

Malleable Iron Unilets & Covers

Automatic Reelites

APPLETON ELECTRIC COMPANY 1709 Wellington Avenue • Chicago 13, Illinois

ELECTRA'S HUSBAND

"LET'S hear some more. This sounds just like what might happen to the electrical contracting business unless we get ourselves organized to do a job."

The enthusiasm of my electrical contractor neighbor for our guest's remarks made Electra and me feel that the evening was well launched.

"Well," continued the guest, "the facts seem to speak for themselves. Just after the war, painting contractors were doing 60% of the outside house painting—today it's 20%."

"How about on the inside?"

"The same story, except that the do-it-yourself had already cut the contractor's share to 35%. Today it is 15% or less."

My guest was feeling at home—I could tell by the way he poured my Kings Ransom.

"I had underestimated the acumen of the American male."

This was the golden entry for Electra. "American male, my foot, I'll bet that Mrs. America does 75% of the do-it-yourself painting. Just look at the ads, they are aimed at the lady of the house. I'll bet it all happens just like the . . ."

I managed to avoid a discussion of my slothfulness.

"It was a combination of circumstances that brought it all about," our guest enlarged. "First and unmistakably, the unions legislated against progress by refusing to allow the use of spray painting and the roller. Then, the contractor would rather do a commercial job because it doesn't require so much human relations. The lady who selects peacock green for her kitchen can be mighty tough to do business with after it is put on."

I seized the occasion to comment on a similar watermelon red fiasco that had occurred in our game room.

"Then, of course," my friend continued, "there is the fact that the room that a painter charges 75 bucks to paint can be painted for $10 if you use a roller."

My contractor friend was shaken. "Didn't you paint manufacturers encourage painting by professionals?"

"No. By the time the trend was observed, the paint rollers had made such a snap out of painting that there was no stopping it. All the manufacturers saw that much more paint would be sold if people would do it themselves *now* rather than wait for the budget to allow for a professional job. So they all climbed aboard and pushed the trend for all it was worth. They brought out new paints, Latex, which dry almost immediately—they brought out paint that didn't smell—and even changed the compounding so that the paint in the can did not have to be conditioned to use.

"BROAD BRUSH STROKES"

"Multihue color charts for easy-to-mix colors and a million other things made it *easy not to have a licensed contractor* do the job. The truth of the matter is that unless you are at a plenty high bracket you can make more money on a Saturday painting than you can on Monday."

You could see an idea taking shape in Electra's head and I grabbed the ball before she could. "Well, it looks like the crux of the question is whether what happened in the painting business could happen to the electrical contractor."

"Yes, and the key point is whether a sizable job could be done without running into trouble with the local inspector," said my neighbor.

It was my day. "Well, remember that outdoor lighting circuit you helped me with? *You* suggested that we not call the inspector in on it."

"I was afraid you'd think of that one. It was a little different from the usual do-it-yourself, but I get the point," my neighbor replied stiffly.

"There are a couple of things that I still don't fit into place. The first is why some smart contractor doesn't set himself up to do rewiring at prices that are reasonable—and we *can* do it in our business because our union hasn't opposed any cost or time-saving devices."

My paint friend entered in with "the same conditions are at work now that were at work when the painters lost out. There is full employment for contractors on new or commercial work and, frankly, contractors just don't like to work for Mr. or Mrs. America."

"I see what you are saying, there is work to be done and if the contractor doesn't make it easy for the homemaker to deal with him, the tendency is for the homemaker to find a friend with some know-how and wade into the job himself."

"I have a question about the electrical contracting business," chimed in my paint-savvy friend. "Is there enough rewiring business to make it worth the contractor's time to get set up to do the work and to do it economically?"

"That's the worst part of the whole story," chimed in my neighbor. "It is estimated, probably accurately, that there is a backlog of $5 billion worth of rewiring to be done. Equally important, with each new high kilowatt-hour use appliance that is sold more homes become prospects so this figure will grow—perhaps $500,000,000 a year."

"Let's go into business," bubbled Electra. "I'll bet I could do a whale of a rewiring job—and get along with the housewife too."

"That does it!" said my disconsolate friend. "At the drop of a hat every Tom, Dick and Sally will be in the business on a do-it-yourself basis and then we contractors will be in the soup—or paint.

"Maybe the trend is already started. I noticed a dandy booklet on how to rewire at Sears the other night and, come to think of it, the electrical department seemed to have increased in size. Yep, painting, wallpaper, plumbing and electrical departments are tremendous—somebody is buying or they wouldn't have such big departments."

My contractor friend looked a bit eased. "Well, I'd like to thank all of you for a traumatic but informative evening. This brings a problem of major importance, which we have all recognized, into focus. The thought of five billion dollars getting away from us contractors is horrifying—particularly since we can see how easily it happened to the painters. On the positive side of the ledger, I have been pondering my obligation to speak at a forthcoming NECA convention. After tonight, I certainly won't need any notes."

Here's MORE Progress in Switchgear from Allis-Chalmers

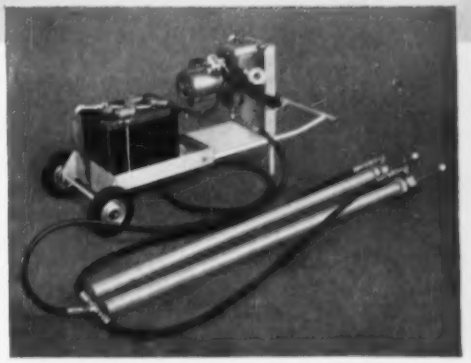
NOW Power-Operated Hydraulic Tank Lifter

Available for Allis-Chalmers intermediate breakers. Another example of Allis-Chalmers progress in simplifying maintenance while increasing safety. Costs no more than hand windlass type, yet cuts raising and lowering time by 80%.

Turning the needle valve completely controls operation and tank may be stopped in any position. Safe even if the hose or fittings are removed during operation.

Pressure energy is obtained from accumulator, power pump or hand pump of *Pneu-Draulic* system.

This is only one of many features of Allis-Chalmers all-new intermediate outdoor oil circuit breakers. Find out more by calling your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.



No *Pneu-Draulic* operator on your breaker? Battery operated hydraulic tank lifter is available. Same cylinder and flexible hose. Same operating characteristics.

Pneu-Draulic is an Allis-Chalmers trademark.

NATIONAL ELECTRICAL Week
FEB. 10-16, 1957

LIVE BETTER ELECTRICALLY

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5124

A question for every electric utility

JUST HOW FLEXIBLE CAN POWER SUPPLY GET?

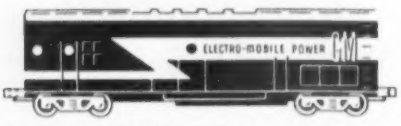
Giant strides to improve flexibility of supply to customers have been taken in recent decades by the electric utility industry. Today power availability must anticipate load growth more than ever before. Inter-connected supply permits transferal of power from one area to another as varying geographical load demands or emergency situations arise.

Even greater flexibility, however, can be attained—by means of Electro-Mobile Power. Truck-trailer or rail units permit shifting increments of power from place to place as demands change. Units can be used singly or in multiple—added like building blocks to match requirements exactly. And provision for impulse starting and stopping allows unattended operation from any location in the system.

Moreover, the placement of Electro-Mobile Power close to the load not only relieves the central station of a block of power, but also reduces the line loss between the central station and the load for that block of power. This is a major factor at time of peak.

Just how flexible can service get? Far more flexible than you might imagine with present equipment if Electro-Mobile Power is employed to answer additional requirements. A joint analysis of your system can reveal the savings and increased flexibility possible with these units. Contact your Electro-Motive representative for full information.

Electro-Mobile Power adds to system flexibility in many ways

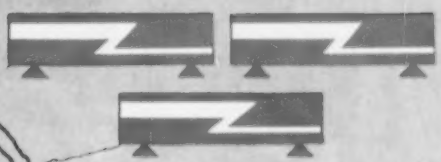


RAIL CAR—1000 kw units for use on sidings or placed on piers for semi-permanent use.

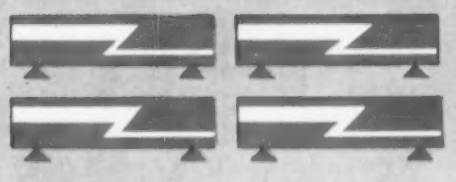
TRUCK TRAILER—500 kw units offer excellent mobility for many temporary applications.

Representative electric utility companies across the country are now providing better service to customers through the use of Electro-Mobile Power. This diagram is a composite of the different jobs these units, both truck-trailer and rail, are performing. Detailed information on these applications—operating costs, KWH produced, reason for use, location, etc.—are available through your Electro-Motive representative.

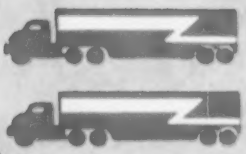
Rail units used for peaking.



Rail units used for boosting.



Rail units used for temporary service during growth stage of new community. Units are added or subtracted until level is reached and permanent facilities can be erected in the most desirable location.



Mobile trailer units thrown into service during temporary outage caused by flood.

Mobile trailer units being used during line relocation resulting from new highway construction.

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS

LA GRANGE, ILLINOIS

Sales Offices in Chicago, New York, St. Louis, San Francisco

A FULL LINE OF QUALITY GROUNDING DEVICES BY

GUARANTEED F WIRING DEVICES

GROUNDING DEVICES WITH A TERRIFIC "QSP" RATING

QUALITY *tops*

SERVICE *outstanding*

PRICE *lowest*

UL

RECEPTACLES

2514
PARALLEL SLOT SINGLE RECEPTACLE
3 WIRE GROUNDING
Wide Ears
Double Contacts
15 Amp.—**125** Volts

CAPS

2517
PARALLEL BLADE ARMORED 3-WIRE CAP
Heavy Bakelite—"U" Shaped Blade for Grounding
Cord Hole Diameter .187—.625

2524
TANDEM SLOT SINGLE RECEPTACLE—
3 WIRE GROUNDING
Wide Ears
Double Contacts
15 Amp.—**250** Volts

2527
TANDEM BLADE ARMORED 3-WIRE CAP
Heavy Bakelite—"U" Shaped Blade for Grounding
Cord Hole Diameter .187—.625

2515
PARALLEL SLOT DUPLEX RECEPTACLE
3 WIRE GROUNDING
Wide Ears—Double Contacts
15 Amp.—**125** Volts

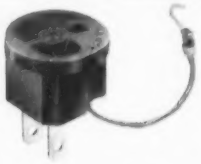
2517B
PARALLEL BLADE 3-WIRE CAP
Heavy Bakelite—"U" Shaped Blade for Grounding
Cord Hole Diameter .437

2525
TANDEM SLOT DUPLEX RECEPTACLE
3 WIRE GROUNDING
Wide Ears—Double Contacts
15 Amp.—**250** Volts

2527B
TANDEM BLADE 3-WIRE CAP
Heavy Bakelite—"U" Shaped Blade for Grounding
Cord Hole Diameter .437

All Items Available in Ivory — And All Receptacles Available on Box Covers

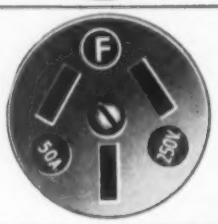
ADAPTER



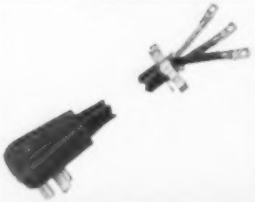
2573-L
3-WIRE BAKELITE GROUNDING ADAPTER
Polarized Slots and "U" Shaped Grounding Slot
3" Green Thermoplastic Grounding Lead.

Portable tools or appliances equipped with new type "grounding caps" may be quickly adapted to regular 2-wire outlets with this new adapter.
15 Amp.—**125** Volts

3631
FOR DRYER AND POWER CORDS. 30 AMP. DRYER AND POWER RECEPTACLE
Flush or Surface Mount
Polarized with "L" Shaped Grounding Slot
30 Amp.—**250** Volts



3651
FOR RANGE AND POWER CORDS. RANGE AND POWER RECEPTACLE
Flush or Surface Mount
Heavy Bakelite
with Patented Swing-Away Terminals—Polarized
50 Amp.—**250** Volts



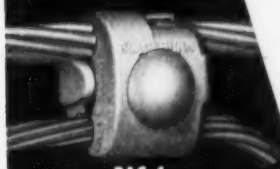
3530
30 AMP. 3-WIRE DRYER AND POWER CORD SET
One Piece Molded Rubber Cap—Includes Cable Clamp
30 Amp.—**250** Volts

CIRCLE F MFG., CO., TRENTON 4, NEW JERSEY

Connect
COPPER with COPPER
ALUMINUM with ALUMINUM
use...

PAC-5
ACSR 6—1/0 Cu. 8—1/0

PAC-3
ACSR 8—2 Cu. 8—2



PAC-4
(formerly PAC 6—0)
ACSR 6—1/0 Cu. 6—2

PAC-7 (replaces PARC 6—0)
ACSR 1/0—336.4
6—1/0 A/R Cu. 8—1/0

BLACKBURN COPPER TO ALUMINUM FITTINGS

BLACKBURN PAC CLAMPS

ELIMINATE CORROSIVE SOLDERS, VOIDS AND FLUXES !

There are many satisfactory copper connectors for connecting copper conductors.

There are many satisfactory aluminum connectors for connecting aluminum conductors.

Blackburn's PAC clamps combine the features of a good copper connector and a good aluminum connector to give you the best copper to aluminum connector available.

Our exclusive method (Patent applied for) of pressure casting molten corrosion resistant aluminum alloy around specially treated pronged copper liners establishes an intimate, low resistance contact of the two metals without using corrosive solder.

The copper liners, which cannot be mated incorrectly, surround the copper conductor establishing a good copper to copper contact.

The aluminum grooves surround the aluminum conductors, establishing a good aluminum contact.

Adequate contact surface and conductor separation is built into Blackburn's PAC clamps to insure long-lasting, trouble-free copper to aluminum connections without setting up cold flow or galvanic corrosion.

Spring action is inherent in the design of PAC clamps and is supplemented with an extra-heavy spring lockwasher insuring permanently tight connections which will withstand temperature fluctuations.

Hot dipped galvanized steel hardware is standard. Aluminum hardware available on all but Catalog #PAC-3.

AVAILABLE THROUGH ELECTRICAL WHOLESALERS EVERYWHERE

JASPER BLACKBURN CORPORATION

35 MADISON STREET • ST. LOUIS 6, MO. • PHONE: MAin 1-2821

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

Mr. W. Nick Tune, Bond Electric Co. Nashville, Tenn.

"Fewer parts to put together"

"Fewer parts to put together and greater ease in hanging are outstanding features of Day-Brite fixtures.

"We like the fact that they are factory assembled and come to us in individual wax-lined containers. You can tell the minute you open the carton that the Day-Brite people have good engineers. There's no problem with breakage and the fixtures are not just thrown together.

"All in all, we're for Day-Brite—they make it easy for us to figure our labor costs and come out with a clean profit."

The fact that contractors all over the country feel the same as Mr. Tune is responsible for Day-Brite's steady increase in acceptance.

Certified Lighting

DAY-BRITE LIGHTING, INC.

5412 Bulwer Avenue, St. Louis, Missouri

71112

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

Attention! All Users of Nickel Alloys...

New Driver-Harris Vacuum Melting Service Now in Operation

After many years of experience with vacuum melting programs, Driver-Harris now offers a complete vacuum melting service for almost all of the 132 special purpose alloys made by this company.

The specific benefits gained by vacuum melting in the production of nickel-chrome alloys are today clearly established. They are:

1. Much closer control of analysis—particularly in alloying with the highly reactive elements, Titanium, Aluminum, Columbium, Calcium, and Zirconium. The normally high affinity for nitrogen and oxygen these elements have is completely eliminated in vacuum melting, thereby opening new avenues in alloy production.

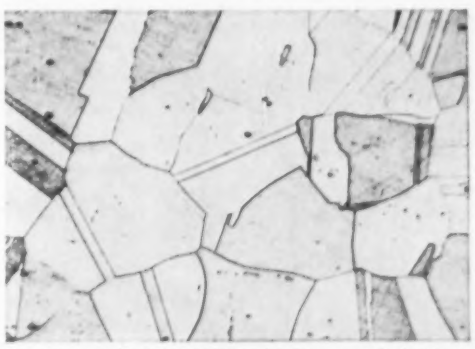
2. Great reduction in inclusions, especially oxides and nitrides, results in higher ductility and tensile properties. In fine wires, the improvement in properties is frequently so great that wire sizes may be reduced without sacrifice of strength. An example of the greatly improved microstructure is illustrated in the metallographs shown.

3. Complete elimination of gas, not from the surface only but from the entire mass. Alloys so produced are therefore more desirable in the manufacture of electron tubes.

4. General improvement in electronic, electrical, and mechanical properties to meet specifications. Because closer control of analysis is a primary advantage of vacuum melting, we can now achieve these specific improvements with remarkable certainty.

Almost all of the Driver-Harris Alloys now vacuum melted and processed under close physical and analytical control show improvement in one or more of the above ways. If you are seeking further improvements in the D-H Alloys you use, inquire now for information on how Driver-Harris Vacuum Melting Service can help you. Address your inquiry to Dept. VMS.

Polished and etched sample of Air Melted NICHROME V in annealed condition.*



Vacuum melted NICHROME V, annealed. Note that reduced inclusions result in much larger grain size for the same annealing treatment.

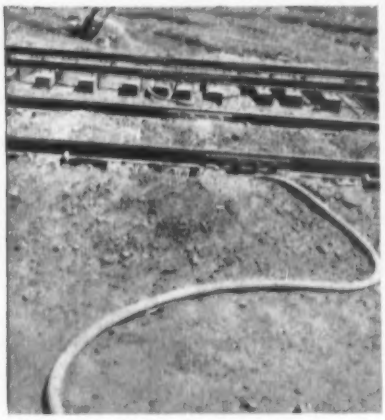
*T.M. Reg. U. S. Pat. Off.

Driver-Harris COMPANY HARRISON, NEW JERSEY

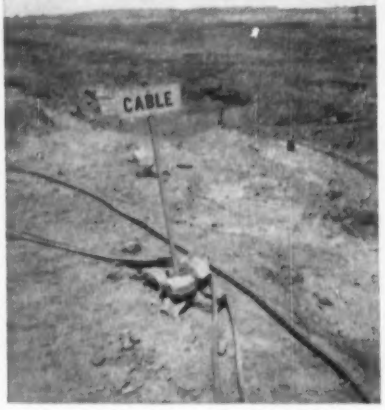
Western Representative: ANGUS-CAMPBELL, INC. • 4417 S. Soto St., Los Angeles 58 • 760 Tennessee St., San Francisco 7

MAKERS OF THE MOST COMPLETE LINE OF ALLOYS FOR THE ELECTRICAL, ELECTRONIC, AND HEAT-TREATING INDUSTRIES

Over-all view of mine. Each ore car in foreground contains about 60 tons of ore.



Tracks are constantly being moved as pit enlarges. Cables are moved with the tracks.



Cables lie in the sun or rain without any protection. They don't need any.

Shovel, being moved, carries 5000 feet of cable with it in the steel box.

Workman manhandles the cable trailing a churn drill as it heads for new location.

Notice long span of this cable bridge and extreme flexibility of cable in foreground.

Shovels lift up to 18 tons in one bite; they operate 24 hours a day.

Entrance poles and meter houses. Cables start from here, work at 440 or 4000 volts.

Iron ore mine finds Tiger Brand Amerclad *in use since 1928*

THE PICTURES show one of the greatest open pit iron ore mines in the world. From pole-head to meter house to shovels and drills, Tiger Brand Amerclad electrical cable serves as a flexible nerve system to supply the huge electrical requirements of machines that operate 24 hours a day in temperatures that range from 100° in the shade to minus 40° in the shoulder-deep snow.

Some of this cable has been in use since 1928, and it's still good.

Other cable is right in the blast area, where it is dragged over sharp rocks and pounded by dynamite-propelled boulders. Even this cable averages six to eight years of useful life.

Look at the pictures and read the captions that tell about operating conditions. You'll see why *no* heavy-duty electrical cable has a greater reputation than Tiger Brand Amerclad. Call your American Steel & Wire representative for the whole story.

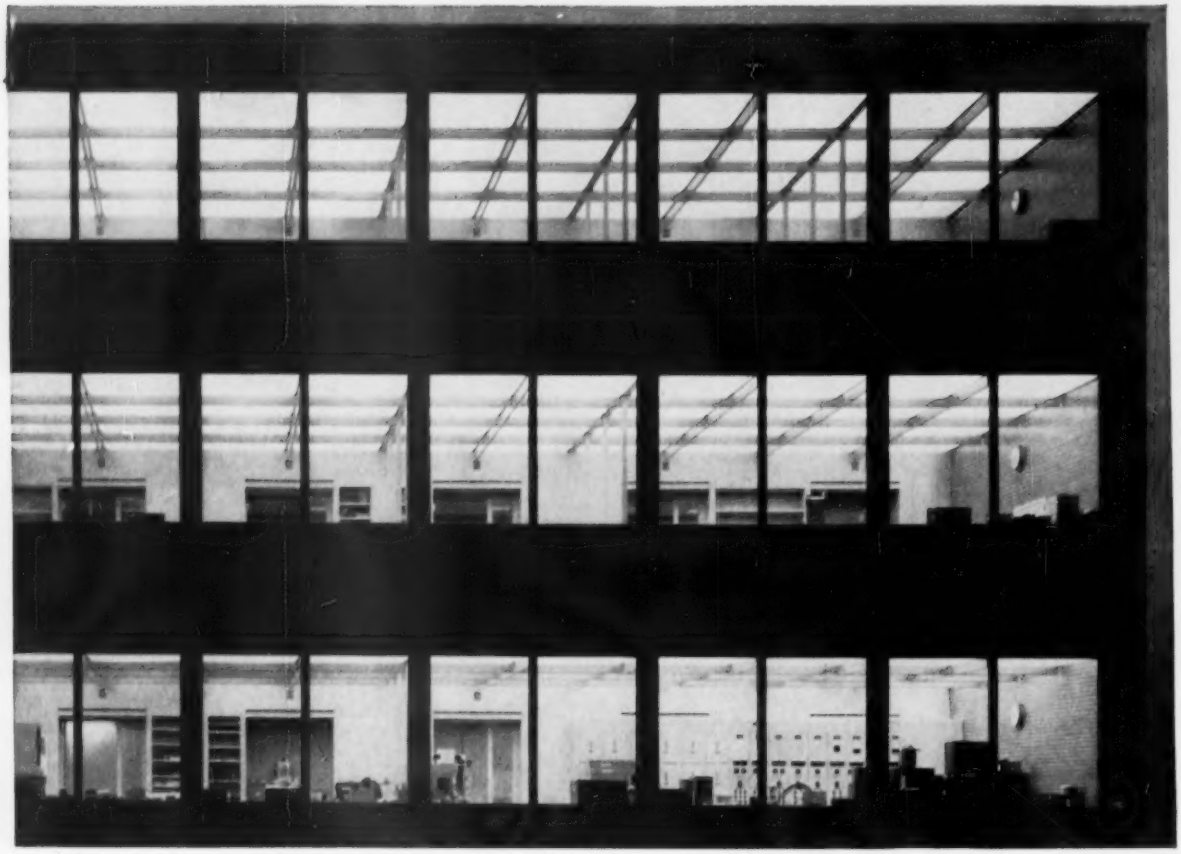
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS TIGER BRAND ELECTRICAL WIRE & CABLE

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- asbestos wire and cable
- mold cured portable cord
- shovel & dredge cable
- paper & lead cable
- varnished cambric cable
- interlocked armor cable
- special purpose wire & cable
- aerial, underground and submarine cable

UNITED STATES STEEL



When you are asked to help out with a customer's lighting problem, you'll find us ready and willing to discuss with you the latest ideas, methods and information available from any one source,—Graybar!

For assistance in the selection of equipment for any lighting system . . .

MERCURY ☐ INCANDESCENT ☐ or FLUORESCENT ☐

. . . call Graybar

Every working day brings you questions from architects, electrical contractors, commercial establishments and industrials concerning the right lighting source and equipment to use for some particular installation. Always remember, you can supplement your own broad knowledge and experience through that of our Lighting Specialists,—men who have contributed to the planning of thousands of installations across the country. Graybar's roots are deep in the lighting industry, and ours is a mutual interest—better lighting for all.

Next time you have a knotty lighting problem, call your nearby Graybar office. Back up your dealers and contractors with the best of the current ideas selected from up-to-date developments of the nation's leading equipment manufacturers whom Graybar represents. You'll help build your load through the kind of lighting that will contribute to better production schedules in industry, greater sales for your merchant customers, and greater living enjoyment in homes in your area.

690-910

CALL GraybaR FIRST FOR

GRAYBAR ELECTRIC COMPANY, INC., 420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK, IN OVER 130 PRINCIPAL CITIES

LCU-10 SERIES

ANDERSON ELECTRIC

Performance at Point-of-Contact is what counts! Anderson Electric's new U-bolt aluminum parallel groove connector with **COVER ALL** spacer . . . maintains cable configuration . . . speeds installation . . . provides more area contact . . . increases range . . . increases pull-out strength . . . assures inhibitor protection.

ANDERSON ELECTRIC CORPORATION
P.O. Drawer 2151, Birmingham 1, Ala.

Aluminum & Bronze Power Connectors • Clamps • Fittings • Accessories for SUBSTATIONS • TRANSMISSION • DISTRIBUTION

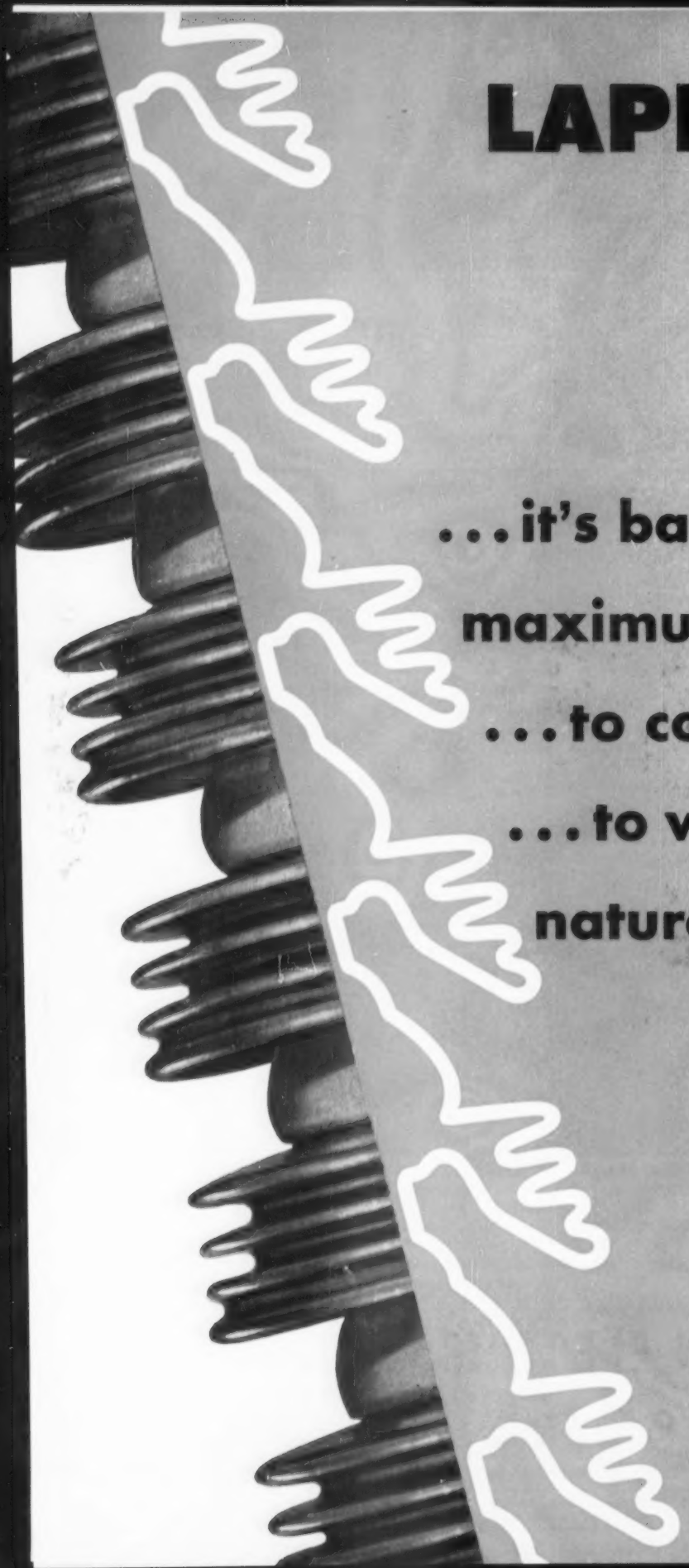
Industrial Engin. & Equip. Corp.
417 S. Hill St.—Michigan 7794
Los Angeles 13, California

Waltham, DeWitt & Krusi
632 Monadnock Bldg.—GArfield 1-5054
San Francisco 5, California

Hamilton Associates
1236 Elati Street—CHerry 4-1505
Denver 4, Colorado

Clarence W. Silver Company
550 West 7th So.—ELgin 5-5378
Salt Lake City 4, Utah

Muth-Richards Company
1804 Bush Pl.—CApitol 2128
Seattle 44, Washington



LAPP FOG-

...it's based on maximum exposure ...to contamination ...to wetting ...to natural cleaning

WESTERN REPRESENTATIVES:
Los Angeles: Earl S. Condon Co.
San Francisco: C. E. Ingalls & Sons
Seattle: Charles F. James
Butte: R. E. McDonough Co.
Salt Lake City: Riter Engineering Co.

TYPE DESIGN

Nobody wants power arcovers. They cause service interruptions, set fire to equipment, add to maintenance costs, and pull line crews out of bed on foul nights.

But power lines do have to run through areas where dust, salt-spray, chemicals—even automotive exhaust fumes—combine with fog or rain to coat insulators with a conductive material such that leakage flashover can occur unless special steps are taken to avoid it.

The "special steps" begin, usually, with increasing the length of leakage path. The distinguishing characteristic of every "fog type" design is the extra inches of leakage distance it provides.

Dozens (maybe hundreds) of insulator designs have been produced for operation under contaminated atmospheric conditions. All have had extra leakage distance, but few have merited a second order by a user. So it must be that the geometry of the increased leakage surface has something to do with its effectiveness.

There is one design that has been successful. It has a record of more than thirty years on this job and has generally been adopted for all types of porcelain insulators for outdoor service.

This is a brief story of the technical considerations back of this design and of the reasons why it can save you money by reducing insulator cleaning, avoiding outages, and providing more dependable operation than is possible with any other type of insulator.

The effect of any contaminant, spread over all or part of an insulator surface, is to lower the surface resistance, thus allowing more leakage current to flow.

It is here that most errors occur in the thinking about contamination problems. Most people, at first thought, consider leakage current bad—that it should be prevented from flowing. As a matter of fact, however, it is the leakage current that saves the insulator, because it is continually drying and correcting the low resistance which fog or drizzle has caused.

Variations in thickness, width of path, and wetness in various areas of the surface result in non-uniform leakage surfaces. These variations are caused by the cleaning action of wind and rain, by non-uniformity in width of surface, by shielding parts of the surface from rain. When rain falls on a dirty insulator, resistance of the wet part is lowered. Since the total resistance is reduced, more current flows, but this current dries the shielded high-resistance areas even more rapidly. Thus voltage piles up over these high-resistance sections, showing increasing fire and arcing, precipitating flashover.

It's the dry, high-resistance areas of insulator surface that start flashover, and any attempt to shield insulators, or parts of them, is to invite flashovers by creating "hot spots" which initiate the flashovers.

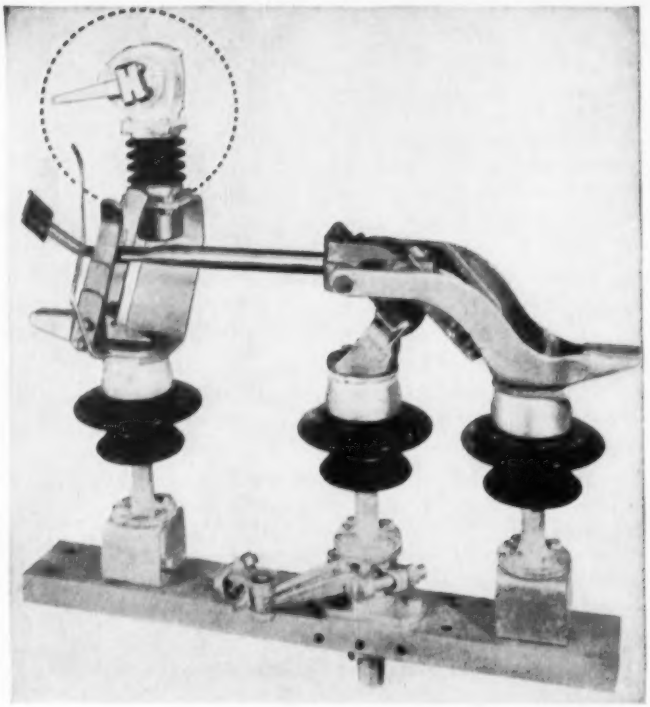
The Lapp principle of Fog-Type design seeks uniformity and tries to obtain this uniformity by maximum exposure—to contamination, to wetting, to natural cleaning by wind and rain. It is typified by short petticoats, spaced to avoid pockets where contamination and moisture can accumulate. In the suspension unit, the smooth underside is also designed for maximum exposure with no restricting baffles to prevent cleaning. Spacing of petticoats is designed to obtain natural cleaning from water flow and splashing from below.

In most areas, no cleaning of Lapp Fog-Type insulators is required. Where a program of maintenance cleaning is necessary, time intervals for cleaning Lapp units may be extended beyond that required for other types of insulators, and the fully exposed leakage path makes such cleaning easy, fast, and economical.

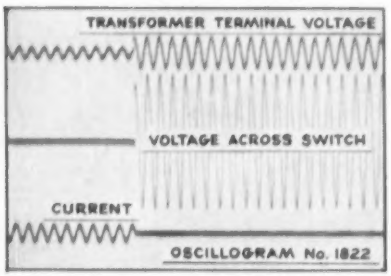
The merit of this principle, and of the design, is confirmed by the service record of Lapp Fog-Type units. Those we ship today look just about like those we produced thirty years ago, and users of these thirty-year-old units have had little reason to look for new concepts of fog design. In the years since, the principle has been adapted to many types of outdoor insulators. Identical fog-type corrugations, used extensively today for high voltage bushings, have obsoleted the wide, spreading petticoats which were previously standard. Major advantages in performance, both mechanical and electrical, of Line Post and Station Post insulators are derived from the adoption of these designs of Lapp Fog-Type corrugations.

You improve the service record of your system, save your company maintenance expense, and improve the sleeping habits of your line crews every time you build a line on Lapp Fog-Type insulators.

Lapp Insulator Co., Inc., Le Roy, N. Y.



Powerupter installed on Delta-Star MK-40 Switch—is actuated by switch blade movement, providing instant circuit interruption without external arc or flame.



Typical oscillogram made during interrupting test of Delta-Star's Powerupter at 15 kv.

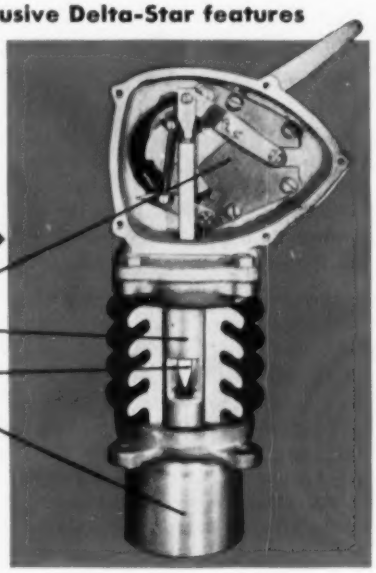
NOW

DELTA-STAR'S New *Powerupter* Switch!

Voltage ratings from 7.5 kv through 34.5 kv—built with exclusive Delta-Star features

This new Delta-Star Powerupter combines a new interrupting device with the most modern disconnecting switches—for interrupting load, magnetizing and charging currents.

The Powerupter features heavy duty construction throughout. Its exclusive automatic trip mechanism provides instant breaking and making speeds independent of switch operation. No feature of Delta-Star switches is sacrificed—every characteristic is retained.



Cutaway view shows *Powerupter* operating advantages

Powerful, high speed mechanism controls speed of Powerupter's operation independently of main switch operating time.

Arcing chamber lined with gas-evolving material. Chamber contains stationary contact and moving contact.

Follower of gas-evolving material confines arc—insuring rapid arc extinction at low current values.

Exhaust chamber provided with muffler—confines and cools exhaust gases released from interrupting chamber.

Ratings: Voltages, 7.5 kv through 34.5 kv; interrupting capacity 600 amp. Continuous current ratings, 400, 600, 1200, 2000 amps.

For all the facts, write Delta-Star or ask your nearby representative. Delta-Star Electric Division, H. K. Porter Company, Inc., 2437 Fulton St., Chicago 12, Ill. District offices in principal cities.

HKP

DELTA-STAR ELECTRIC DIVISION

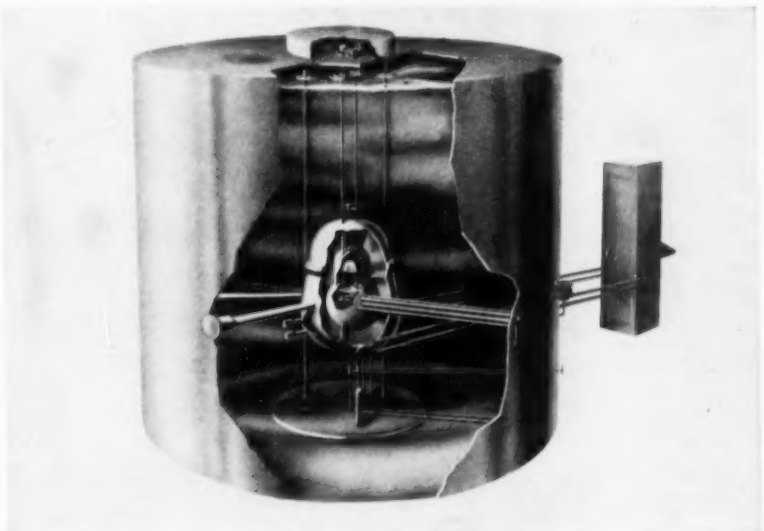
H. K. PORTER COMPANY, INC.

Divisions of H. K. Porter Company, Inc. are: Alloy Metal Wire, Connors Steel, Delta-Star Electric, Henry Disston, Laclede-Christy, Loschen Wire Rope, McLain Fire Brick, Quaker Pioneer Rubber, Quaker Rubber, Riverside Metal, Vulcan Crucible Steel, W-S Fittings.

NUCLEAR NEWS FROM ATOMICS INTERNATIONAL

One-man Laboratory Reactor designed for industry, hospitals and schools—available for $55,000*

A new atomic tool that will speed and broaden nuclear research and training has been designed and developed by ATOMICS INTERNATIONAL. Here is a low cost instrument that even a moderately-budgeted hospital, industrial or educational laboratory can use to teach and conduct research in nuclear science.



New Laboratory Reactor provides a neutron flux of 10^{11}, a gamma ray flux of 10^{6}.

The Laboratory Reactor (LR) is a 5-watt, solution-type nuclear reactor. It can be operated and maintained by one person. It is 8-feet high, 8-feet in diameter. Power requirements are 110-volts at 60 cycles. It is completely fabricated at the factory and shipped as a unit—manufactured and installed in about 6 months. It has a wide range of applications.

As a laboratory instrument for research programs, the LR permits qualitative analysis by the neutron activation method—including measurement of coatings on metals, moisture testing, and liquid level monitoring. It will produce more than 100 different radioisotopes, about 40 of which have half-lives short enough to eliminate the need for costly contamination controls and waste handling systems.

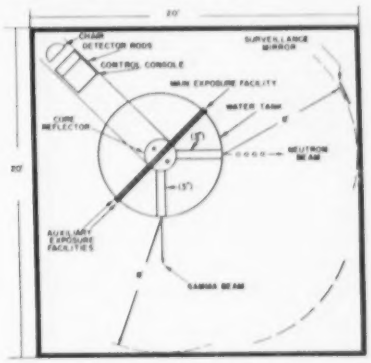
The LR can perform medical research functions such as genetic mutation studies, tracer research on plants and animals, radiation chemistry, and testing by the danger coefficient method. Equipped with facilities to conduct several experiments simultaneously, the reactor is ideally suited as a teaching tool in nuclear engineering, nuclear physics, radiochemistry and radiobiology. The basic behavior of neutron chain reactions, response to control elements, and the effect of delayed neutrons are a few of the 40-odd experiments that can be performed on the Laboratory Reactor.

The core of the reactor is a stainless steel sphere with an overhead convection recombiner. The fuel is uranyl sulphate enriched in uranium 235. The core is enclosed in a 6-inch lead reflector-shield. The complete 3500-pound unit—32" high, 24" wide—is centered in an 8-foot tank filled with water which serves as a biological shield.

The gas recombining system is contained in the core tank. A cylindrical screen above the core solution holds platinized alumina catalyst pellets which recombine hydrogen and oxygen gases formed during reactor operation. These fission product gases—valuable in experimental programs—can be withdrawn from the core through special gas lines.

The LR operator handles all controls and detection equipment from a control console adjacent to the reactor. Two cadmium control rods move vertically through the core—driven by electric motors manually controlled by the operator. The lead-weighted rods are attached to an electromagnet which releases automatically to let the rods fall by gravity into the core and shut down the reactor in event of a scram.

Instrumentation provides safety, low-cost and flexibility. At startup, three boron-lined neutron counters are fully inserted in detection tubes in the water tank. As power level increases, the operator withdraws the counters. Rate circuits—adjusted in response time constants—provide two ¼-second circuit channels for safety and observation and one 2-second channel for accurate power recording.



The LR can be installed in a 20×20-foot floor area.

ATOMICS INTERNATIONAL, a division of North American Aviation, Inc., is a major reactor builder—experienced in the design, construction and operation of nuclear reactors for research and the production of power. If you are interested in the LR—or any phase of reactor development—ATOMICS INTERNATIONAL is staffed and equipped to serve you. Please write, Director of Technical Sales, Dept. ET-71, ATOMICS INTERNATIONAL, P.O. Box 309, Canoga Park, California. Cable address: ATOMICS.

*F. O. B. LOS ANGELES

ATOMICS INTERNATIONAL
A DIVISION OF NORTH AMERICAN AVIATION, INC.
PIONEERS IN THE CREATIVE USE OF THE ATOM

NEWEST REASON WHY ALL TRANSFORMERS ARE NOT ALIKE

Add 10 KVA... use same mounting

Tough Formex* wire, now in all ratings, makes General Electric pole-type distribution transformers up to 10% smaller . . . simplifying "changeouts" to next higher rating.

"Changing out" transformers—that is, substituting a higher-rated unit for the old lower rating already on the pole—can be a time-consuming job. What really makes it tough is having to change pole hardware and set bigger poles for the higher rated units.

But today such installation headaches can be largely a thing of the past. For General Electric has now completed the introduction of a whole new line of pole-type transformers with smaller tank sizes.

*Reg. Trademark of General Electric Co.

Use of Formex wire cuts tank sizes

Using Formex wire instead of wire covered with bulky cotton-and-paper insulation, G-E engineers have appreciably slimmed down tank sizes. In most cases, a higher-rated unit now fits the same mounting hardware and same pole as the lower-rated unit already in place.

Take the new G-E 25-kva conventional transformer. It used to be 38 inches tall. Now it's only 34; so it fits in the same spot as a 15-kva unit hung five years ago. The new 25-kva transformer also features a mounting bracket with bolt holes drilled to match the mounting holes for 15-kva units. So there's no longer any need to drill new holes in the pole in order to substitute a 25-kva unit for a 15-kva unit.

No overnight development

The new units are no overnight development. They are the result of continual research and experimentation. General Electric first used Formex wire for high-voltage coils. Gradually Formex wire was used on low-voltage coils in a limited number of ratings. And today's new designs are the culmination of this work.

Formex Wire Gives Extra Dependability

Formex wire sets new standards for electrical and mechanical strength. The impulse strength of Formex wire, for example, is phenomenal; three mils thickness of the film insulation has *twice* the impulse strength of six mils of ordinary paper and cotton. Formex is so rugged it will withstand twisting, scraping, burning and hammering that would demolish ordinary insulation.

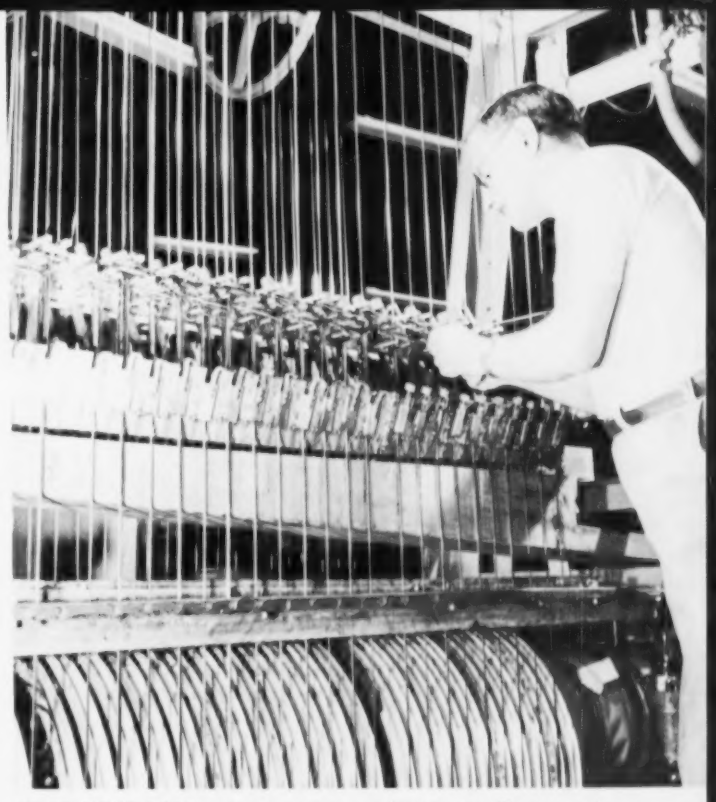
The changeover to Formex is complete for all ratings through 167 kva.

All Transformers Are Not Alike

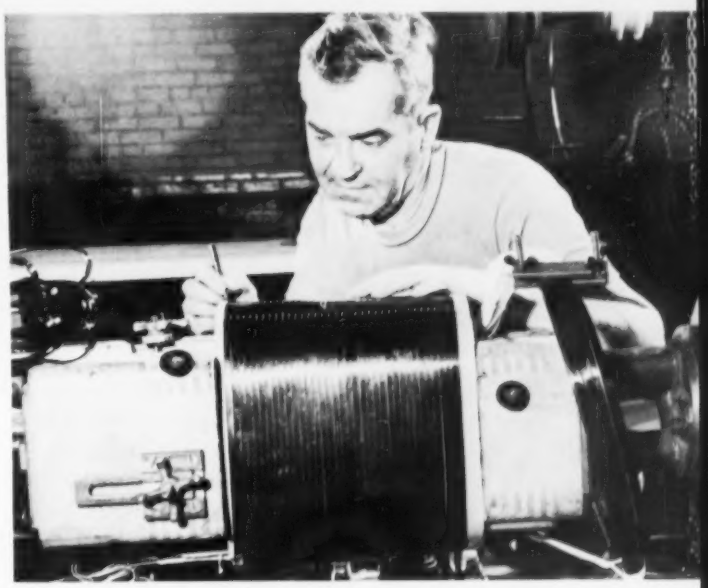
Formex wire is only one advantage of General Electric distribution transformers. Others include *impulse testing* to assure extra-long life, *one-piece clamping bands* to give superior sealing and simplify servicing, AL/CU *terminals* to assure tight connections with either copper or aluminum conductors, and many others—evidence that all transformers are *not* alike.

LIVE BETTER ELECTRICALLY

Prove to yourself how tough Formex wire is. For a sample that you can test, write to Section 431-48, General Electric Company, Schenectady 5, N.Y.



UP TO EIGHT COATS of enamel are applied to the Formex wire, and each coat is baked. Mechanically rugged, Formex wire has great electrical strength. Just 3 mils thickness of film has twice the impulse strength of 6 mils of paper-and-cotton insulation.



COMPACT FORMEX WIRE COILS together with improved core steel, make possible reductions of up to 10 per cent in transformer size and weight . . . yet Formex wire coils have great short-circuit strength. The result, transformers are lighter, easier to handle.

Progress Is Our Most Important Product

GENERAL ELECTRIC

ASK YOUR MAN IN THE FIELD ABOUT THE

design advantages

OF FISHER-PIERCE PHOTOELECTRIC LIGHTING CONTROLS

Any utility field man who has installed a Fisher-Pierce photoelectric control knows firsthand the many advantages of its clean, straightforward design. He appreciates, for example, time-saving plug-in installation of the one-piece electronic head; the ease, speed and safety with which he can handle compact F-P controls; the clean meter plate that has nothing to interfere with external wiring; the easily checked fuse. He knows the weatherproof glass enclosure design gives him quick, easy access to the control chassis; that he can orient an F-P control after mounting; and that component layout permits trouble-free servicing as well as maximum impulse strength. These advantages are important to the utility itself as well as the field man, since they mean rapid, low-cost installation and substantially reduced maintenance. Only F-P controls provide these advantages, *plus* these four other important features:

Series 64400

COMPONENT QUALITY — Pre-aged, long life tubes • Wire wound potentiometer • Metal encased capacitors • Non-hygroscopic 1P39 phototube • Balanced armature Sigma sensitive relay.

PROTECTION — From surges and lightning, by linen-based bakelite sub-mounting chassis and proper component spacing Circuit and load fuses, and lightning arrestor • Fail-safe operation.

ADAPTABILITY — Three basic series and numerous models for all mounting requirements, operating voltages, load capacities and desired contact arrangements.

DEPENDABILITY — Proven by the thousands of F-P controls used by hundreds of utilities, over the past ten years.

Series 63300C

Complete specifications and operating data are contained in informative F-P Bulletins, available on request. Or call the Fisher-Pierce sales representative in your area, for point-by-point proof of F-P superiority.

THE FISHER-PIERCE CO., INC.

43 Pearl Street, So. Braintree, Boston 85, Mass.

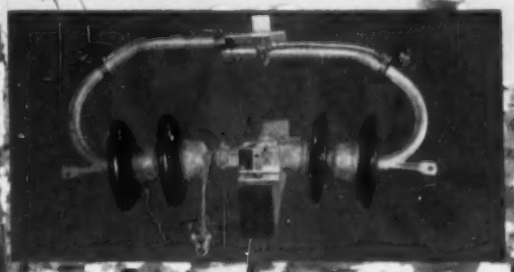
KPF switches operate smoothly, surely in all weather!

What's *your* weather? Arctic cold? Tropical rain? Parching desert sun? KPF switches operate unfailingly under all conditions. Their exclusive mechanical design permits a slight amount of movement before opening the switch so even extreme ice formations can be cracked off easily. Warpage cannot jam the switch, and lack of lubrication is never a problem.

KPF phase units consist of two rigid dead-end assemblies with rigid jumpers forming the switch arms. One is stationary, the other rotates to make or break the circuit. There's no delicate, complex mechanism to malfunction.

Their utmost design simplicity means KPF switches weigh less, install faster without extra bracing, need no servicing, cost less. They have proved themselves in almost 50 years of major system operation, on lines carrying 7.5 to 110 KV and amperages from 200 to 600 amperes.

Get the details, then order a test installation and see for yourself!



For catalog, complete specifications, write direct

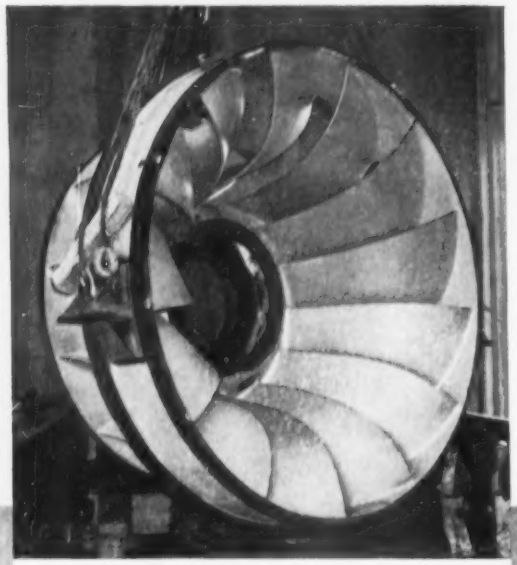
KPF
AIR BREAK SWITCHES
Standard for nearly half a century

3615

KPF ELECTRIC COMPANY

Dept. W, 1624 E. Alpine Avenue
Stockton 5, California

Two more giant B-L-H turbines for Garrison Dam

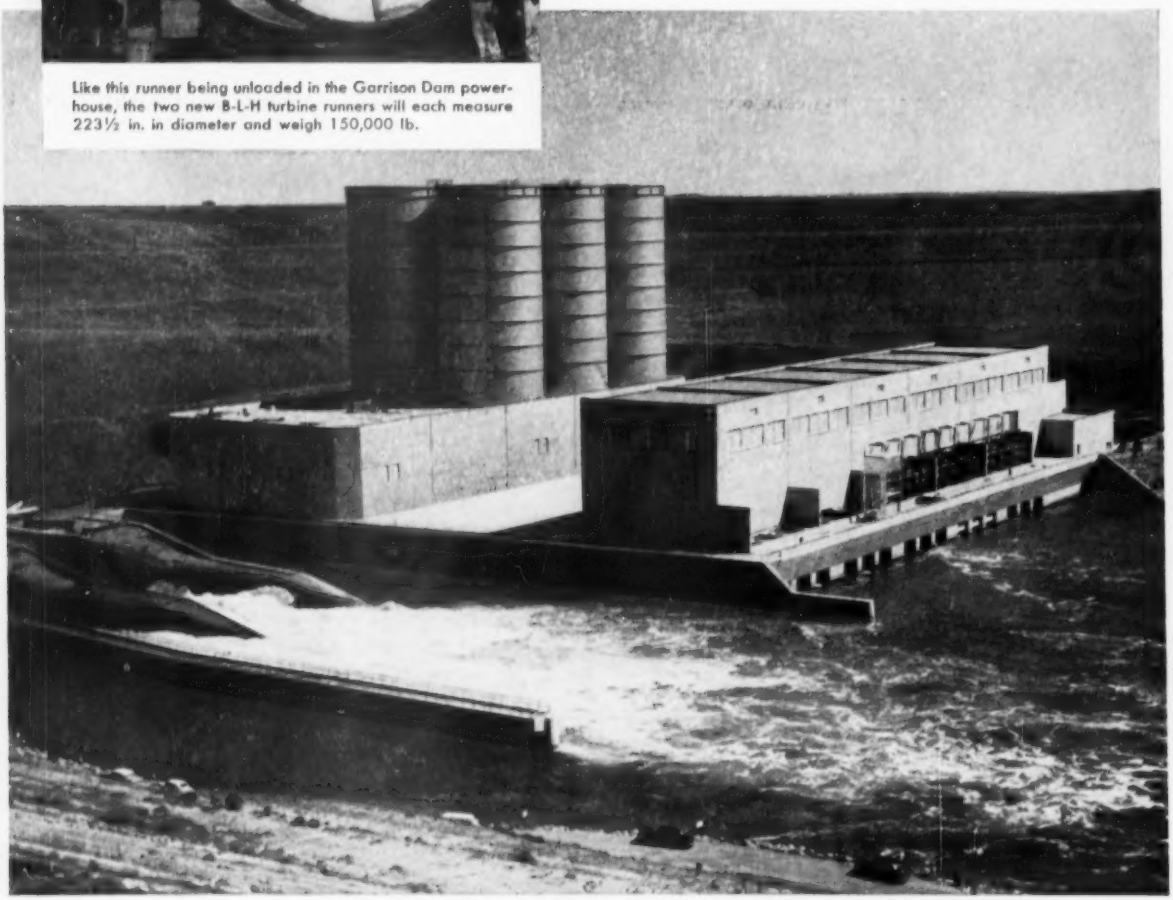


Like this runner being unloaded in the Garrison Dam powerhouse, the two new B-L-H turbine runners will each measure 223½ in. in diameter and weigh 150,000 lb.

With three of its huge Francis-type turbines already in operation at the Garrison Dam on the Missouri River at Riverdale, N.Dak., Baldwin-Lima-Hamilton is now building two more to be delivered in 1958 and 1959. Their installation will mark the completion of a project which encompasses the largest reservoir surface area in the world.

Each of these new B-L-H turbines will deliver 90,000 hp at 90 rpm under 150-ft. head. With all five B-L-H turbines in operation, Garrison Dam will be the source of enough electric power for a city of 1,200,000.

Baldwin-Lima-Hamilton is internationally recognized as the leader in design and manufacture of hydraulic turbines. For a copy of our illustrated Turbine Bulletin 1001, write to B-L-H Corporation, Philadelphia 42, Pa. or to Pelton Division (B-L-H), 2929 Nineteenth Street, San Francisco 10, Calif.



Powerhouse and surge tanks at Garrison Dam, under construction on the Missouri River. Included in work yet to be done is installation of two additional power generating units, the turbines for which are now being built by the Eddystone Division of Baldwin-Lima-Hamilton. Power output of this dam will be 450,000 hp.

BALDWIN · LIMA · HAMILTON

Eddystone Division

Philadelphia 42, Pa.

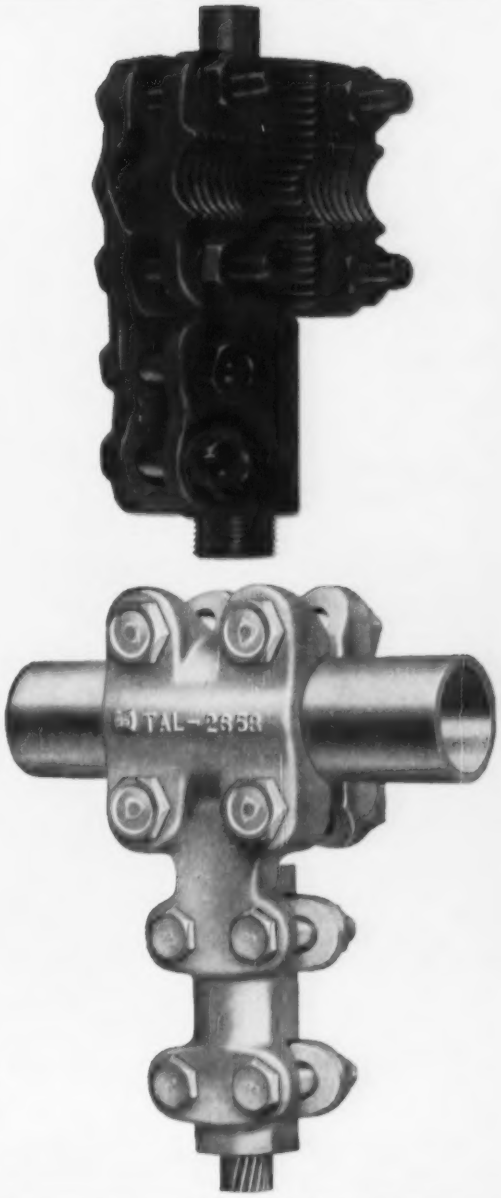
Hydraulic turbines • Weldments • Dump cars • Nonferrous castings

BRONZE OR ALUMINUM FITTINGS BY SOUTHERN STATES

Today, there is available from Southern States a wide choice of fittings in either bronze or aluminum. In addition to standard items, special designs can be quickly supplied to meet specific customer requirements.

Southern States aluminum connectors have exceptional cross-sectional strength, extra-large areas of contact engagement, and recessed self-retaining bolt heads. Like their bronze companions, they are fully capable of: 1) serving as self-supporting members; 2) providing a good electrical connection; 3) developing the full strength of clamping bolts without visible distortion; 4) carrying the current of the conductor without excessive temperature rise; and 5) being installed with a minimum of effort and time.

Specify Southern States fittings for the best protection at every connection.

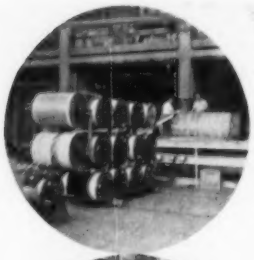


NEW! SOUTHERN STATES ALUMINUM CONNECTOR CATALOG NOW AVAILABLE

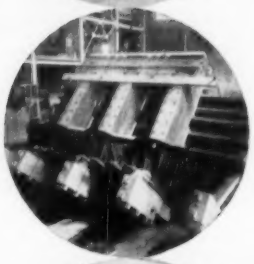
SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

IN CANADA
Dominion Cutout Co., Ltd., Toronto

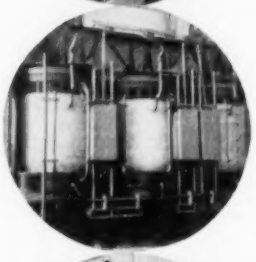
Start of Coil Winding



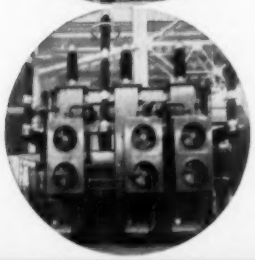
Raising Core To Vertical Position For Coil Stacking



Assembled Core and Coil Unit



Completed Transformer



MEB7-1

ANOTHER HIGH KVA MOLONEY POWER TRANSFORMER NOW IN SERVICE

Recently installed in a large southern utility system, this Moloney Power Transformer is now in service.

Rated 135,000 KVA, 3 phase, 60 cycle. F. O. A. Outdoor Type, High voltage 115,000 Y/66,400; Low voltage 13,800 Delta.

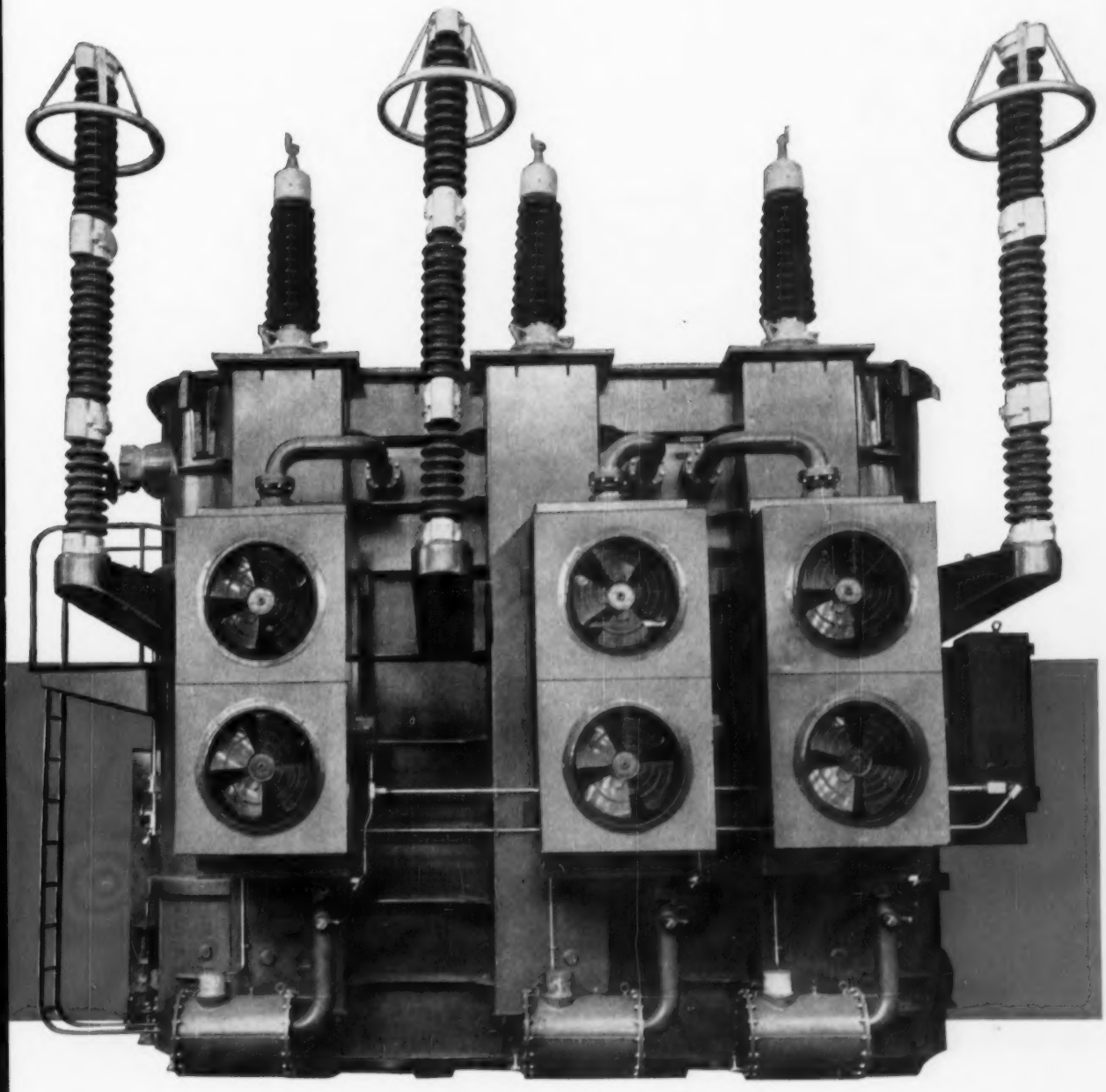
Engineered, designed, fabricated, assembled and tested in the Moloney Factory, this transformer is another one of many which will aid utilities in meeting the ever growing power demands of today and tomorrow.

Consult your local Moloney representative today concerning your power transformer needs.

MOLONEY ELE

Power Transformers • Distribution Transformers • Load Tap Changing Trans-formers
Network Transformers • Series Street Lighting Transformers • Subway

SALES OFFICES IN ALL PRINCIPAL CITIES



C T R I C C O M P A N Y

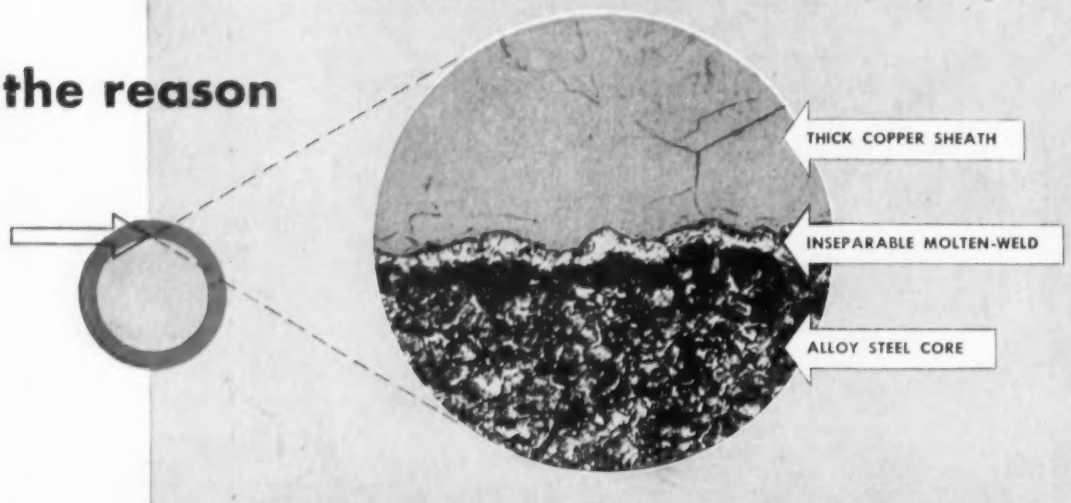
Regulating Transformers • Step Voltage Regulators • Primary Unit Substations • Secondary Unit Substation Transformers
Transformers • Industrial Dry Type Transformers • Capacitors • Transformers and Inductors for Electronics

FACTORIES AT ST. LOUIS 20, MISSOURI AND TORONTO, ONT., CANADA

The **molten-weld**

(microphotograph shows weld area of Copperweld Wire, greatly enlarged)

is the reason



for the **dependability • economy • long life**

of Copperweld products

TRADE MARK

COPPER MOLTEN-WELDED TO STEEL

Only Copperweld* is molten-welded—an exclusive process which permanently interlocks copper and steel, uniting them so strongly that they cannot be separated. This molten-weld is the reason Copperweld Products are different and better—performing as a single material which combines the conductivity and rust-resistance of copper with the strength of steel.

You're SAFE when you use Copperweld. It pays off in dependable and economical performance.

*Trade Mark

COPPERWELD STEEL COMPANY WIRE AND CABLE DIVISION *Glassport, Pa.*

For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

CONDUCTIVITY STRENGTH PERMANENCE

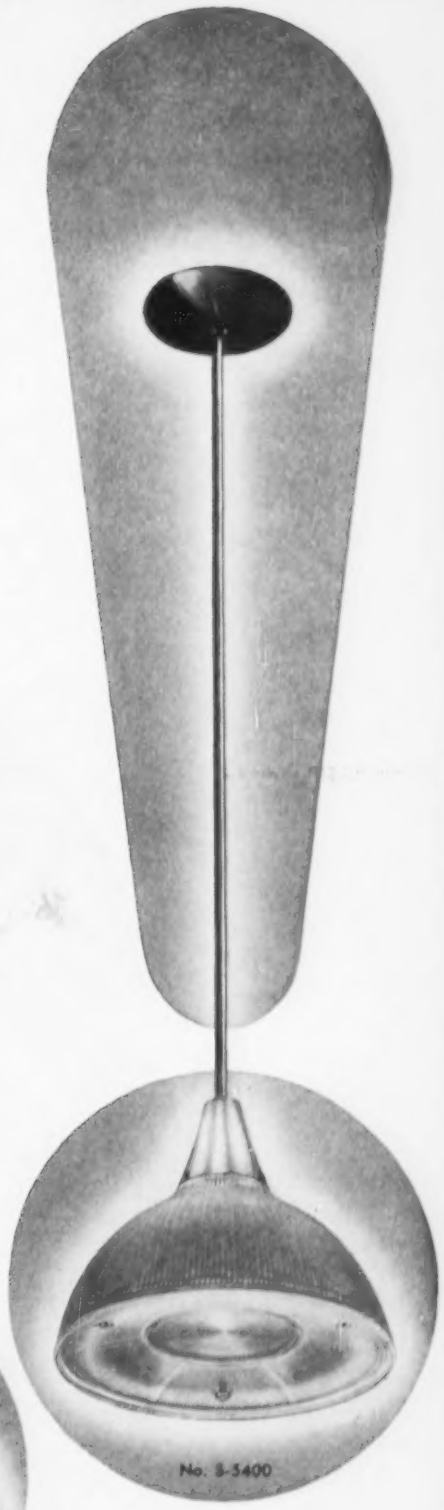
PROVED IN SERVICE FOR OVER 40 YEARS

FOR THE POWER INDUSTRY: guy strand • ground rods and clamps • anchor rods
power conductors • weatherproof wire • messenger strand
overhead ground wire • counterpoise wire
pole grounding wire • tie wire

Write for your copy of the Copperweld Engineering Handbook

new...

the most advanced achievement in fifty-seven years of lighting research... the incomparable PARADOME*



The finest semi-direct lighting unit ever engineered for balanced-illumination in

CLASSROOMS, MODERN OFFICES, SHOPPING CENTERS, PUBLIC INSTITUTIONS . . .

Through an altogether new idea, using a concave circular CONTROLENS* and a new Prismatic Reflector enclosed in a special fiber-glass (FIBERGLO*) cover, an extraordinary control of light is achieved. Maximum illumination is directed to vital areas with the best visual comfort and lowest brightness. Paradome's graceful design conforms with all modern interiors—particularly today's classrooms.

Write for complete engineering data on Paradome. No obligation.

Lighting Authorities Since 1898

For Better Lighting . . . Be Specific . . .

HOLOPHANE COMPANY, Inc. • 342 Madison Avenue, New York 17, N. Y.
The Holophane Co., Ltd., The Queensway, Toronto, Ont.

HOLOPHANE

*Trademark

John Harrell, Manager Voltage Regulator Sales, points out that URL-16 feeder regulator with new CVR relay and instant-response Geneva gear tap changer combine to offer superior regulation with less maintenance.

*Trademark

Westinghouse 16-step regulation means you carry greatest load, produce most revenue

URL-16 with new CVR relay performs three exclusive functions:

1. FASTER CORRECTION OUTSIDE SET BANDWIDTH

The new CVR relay designed with inverse time characteristics actually evaluates the need for speed of response . . . steep voltage variations are corrected more quickly than gradual voltage changes. Result —a narrower effective bandwidth.

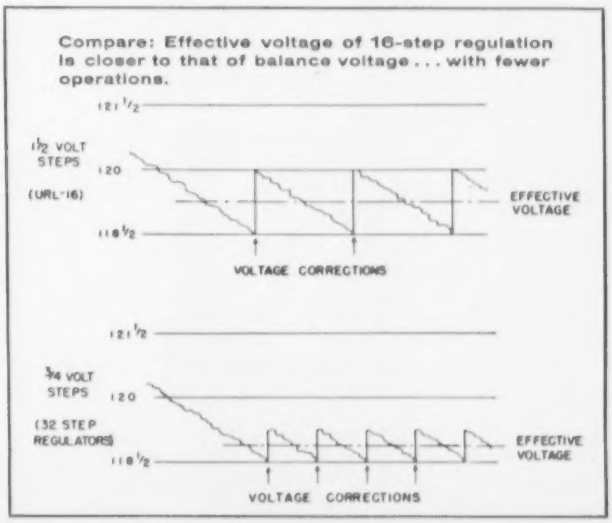
2. INSTANT-RESPONSE TAP CHANGING

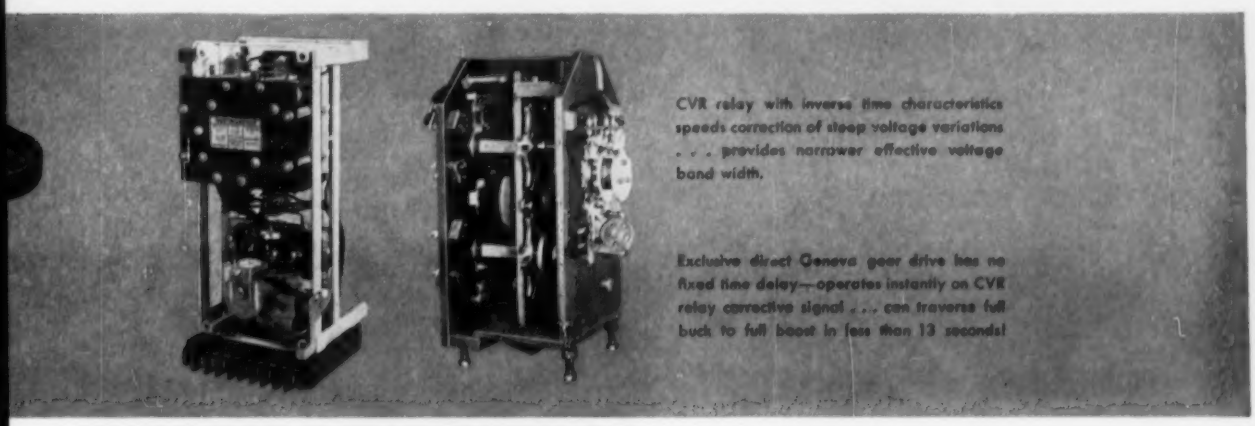
Because of direct Geneva gear drive there is no fixed time delay between relay and tap-changer operation. Tap changer operates instantly . . . can traverse full buck to full boost in less than 13 seconds!

3. 16-STEP REGULATION

The exclusive URL-16 with 1½-volt steps corrects exactly to balance voltage on a 3-volt bandwidth bringing the effective voltage nearer to this level. Similarly, the higher correction on 2-volt or greater bandwidth results in effective voltage closer to the desired level. URL-16 slashes number of corrective operations by 42%, contacts erosion 15%. Result—substantial savings in maintenance.

A narrower effective bandwidth means you can put more load on your system . . . get more revenue for power delivered. Specify new Westinghouse URL-16 regulators on your system. J-70779-X




CVR relay with inverse time characteristics speeds correction of steep voltage variations . . . provides narrower effective voltage band width.
Exclusive direct Geneva gear drive has no fixed time delay—operates instantly on CVR relay corrective signal . . . can traverse full buck to full boost in less than 13 seconds!

YOU CAN BE **SURE**... IF IT'S

Westinghouse

We feel justifiably proud of having pioneered a service which has been so favorably received by so many companies in the West, and having treated, in 15 years, over two million standing poles without one dissatisfied customer.

DAN KAMPHAUSEN CO.

DENVER, COLORADO

Pole Inspectors & Treaters, Inc. **Pole Sprayers, Inc.**

SAVINGS—so important that no well managed Utility Company can afford to overlook them.

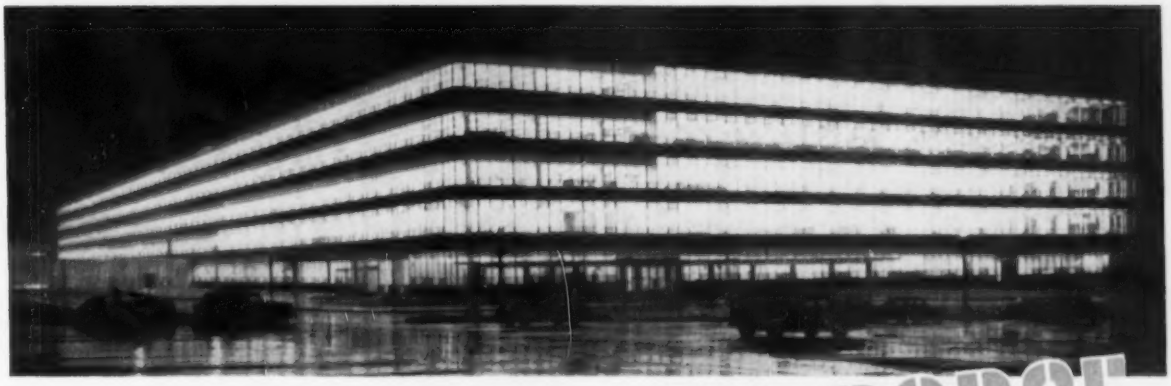
The economies of keeping older standing poles sound and in place are so great that almost any formula will show big dollar savings for every year that replacement can be deferred. Standing pole preservation is sufficiently important to warrant some straight thinking and careful planning so as to avoid staggering accumulating replacement costs.

TWO TIME PROVEN TREATMENTS

1. Below groundline inspection and treatment reliably extends pole service life for 10 years.
2. Above groundline treatment provides 25 years of additional service life.

All work is done by our especially trained and experienced personnel.

New Home for Army Service Records



WIRE BY PHELPS DODGE

This modern AG Record Center building* in St. Louis, Mo., is virtually an oversized glass filing cabinet. Housed here are service records of 20,000,000 persons who have served in the Army or Air Force since the Civil War.

A dependable wiring system was an important part of the building's specifications. That's why Phelps Dodge wire and cable was installed.

On every wiring job, where top-quality materials, expert workmanship and experienced "know-how" are called for, *it pays to rely on Phelps Dodge and your Phelps Dodge distributor!*

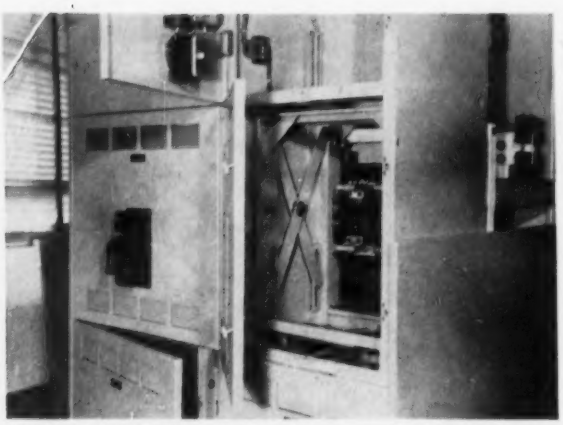
*Joint General Contractors: Fruin-Colnon Contracting Co., St. Louis, Mo., and Peter Kiewit Sons' Co., Omaha, Neb., Electrical Contractor: Mack Electric Co., St. Louis, Mo.

PHELPS DODGE COPPER PRODUCTS CORPORATION

SALES OFFICES: Atlanta, Birmingham, Ala., Boston, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Fort Wayne, Greensboro, N. C., Houston, Jacksonville, Kansas City, Mo., Los Angeles, Memphis, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Ore., Richmond, Rochester, N. Y., San Francisco, St. Louis, Seattle, Washington, D. C.

SECONDARY UNIT SUBSTATIONS

ENGINEERED AT I-T-E and coordinated to meet the operating conditions found in your plant.

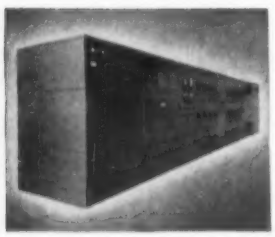


BUILT AT I-T-E with such extra features as circuit breaker test-position with doors closed.

TESTED AT I-T-E to assure ease of installation, and top performance under operating conditions.

SHIPPED FROM I-T-E to assure prompt delivery of one complete "package," ready to install.

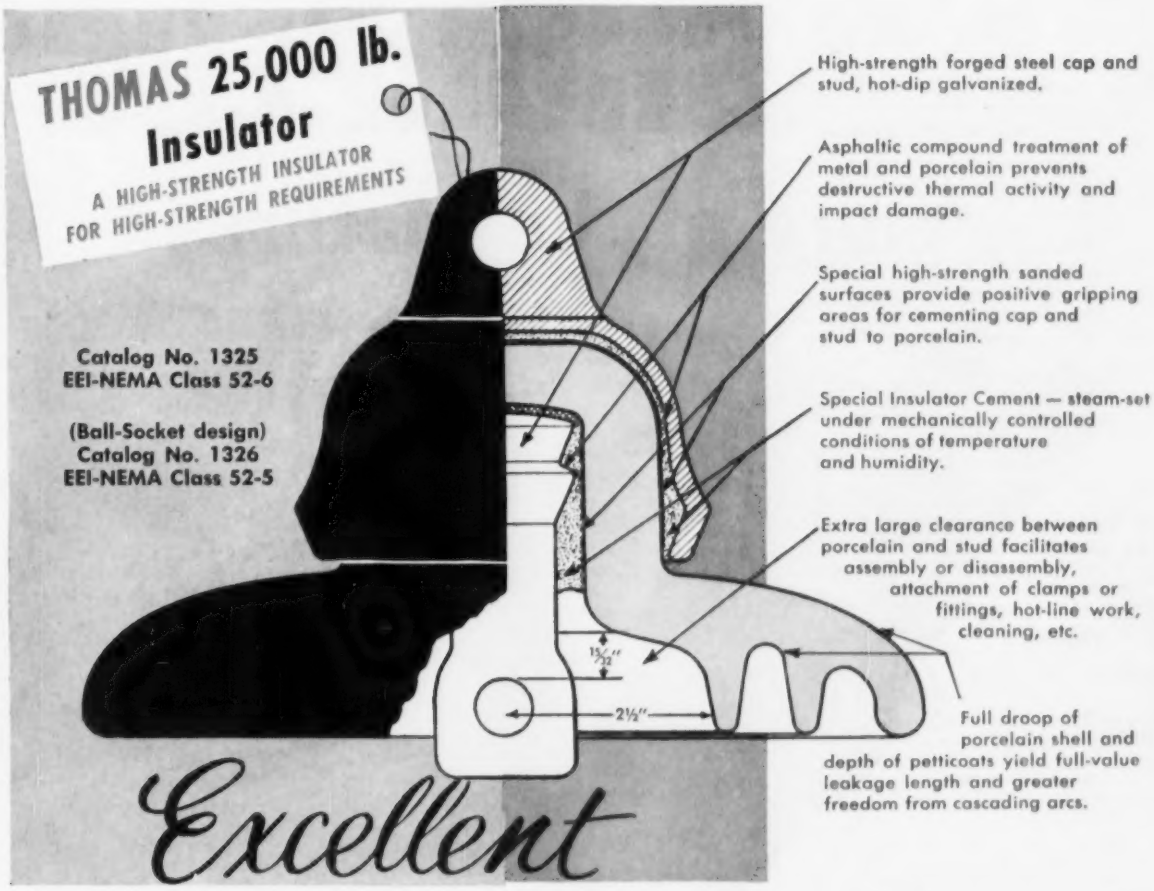
I-T-E MAKES IT EASY TO BUY COMPLETELY COORDINATED UNITS



Only I-T-E builds transformers and switchgear in the same plant. This permits them to assume all responsibility for your unit substation requirements. Close association of engineering and production relieves you of detailed planning, paperwork, and the problems of coordinating deliveries. Shipment is from one location. Installation is speeded. Substation components are completely integrated to provide top performance at low overall cost.

Typical of the extra value which *only* I-T-E Unit Substations offer is circuit breaker test-position with doors closed—and without removing them. This means additional safety to operating personnel, greater cleanliness, simplified tagging out of circuits, and longer life. I-T-E Secondary Unit Substations can be supplied for any application, indoor or outdoor, and in any standard rating. For details, contact the I-T-E sales office nearest you. Or write I-T-E Circuit Breaker Company, Switchgear Division, 19th & Hamilton Sts., Philadelphia 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY • Switchgear Division


THOMAS 25,000 lb.
Insulator
A HIGH-STRENGTH INSULATOR
FOR HIGH-STRENGTH REQUIREMENTS
Catalog No. 1325
EEI-NEMA Class 52-6
(Ball-Socket design)
Catalog No. 1326
EEI-NEMA Class 52-5
High-strength forged steel cap and stud, hot-dip galvanized.
Asphaltic compound treatment of metal and porcelain prevents destructive thermal activity and impact damage.
Special high-strength sanded surfaces provide positive gripping areas for cementing cap and stud to porcelain.
Special Insulator Cement — steam-set under mechanically controlled conditions of temperature and humidity.
Extra large clearance between porcelain and stud facilitates assembly or disassembly, attachment of clamps or fittings, hot-line work, cleaning, etc.
15/32"
2½"
Full droop of porcelain shell and depth of petticoats yield full-value leakage length and greater freedom from cascading arcs.
Excellent

Write for your free copy of
THOMAS EEI-NEMA Standards Bulletin

1873 THOMAS INSULATORS our 83rd year RELIABILITY 1956

"Specify Thomas"—The Best by Line Test

Service Records

... beginning in 1920 attest to enviable performance records which now add up to an astounding *2 million service-years* for this "Thomas Quality" unit.

As the demand for higher strength insulators increases, Thomas offers this unit in both Clevis and Ball & Socket designs. Both incorporate all the latest improvements in quality manufacture and design plus an unexcelled, time-tested performance record. With the accent on quality you get a custom-built insulator for your most severe service . . . there's a Performance-Proved difference.

The R. Thomas and Sons Co.

TX-52

Offices: CHICAGO, LISBON OHIO, NEW YORK

SALES REPRESENTATIVES

C. G. Anderson, Chicago • **E. B. Anderson Co.**, Detroit • **Ken H. Best**, Seattle • **Nellis B. Bronner, Jr.**, Syracuse • **R. E. Cunningham & Son**, Los Angeles • **W. H. Eddy Electric Products, Inc.**, Phoenix • **Electrical Distributors Co.**, Philadelphia • **Engineer Sales Co.**, St. Petersburg • **J. W. Fraser Co.**, Charlotte • **Hamilton Associates**, Denver • **Geo. E. Honn Co.**, San Francisco • **Hugo Sales Co.**, Minneapolis • **Johansen Associates**, Lincoln • **J. P. Lane Co.**, St. Louis • **J. O. Mann**, Pittsburgh • **Osgood Associates**, Atlanta • **John G. Pettyjohn Co.**, Knoxville • **J. F. Schaefer & Co.**, Kansas City • **M. H. Snyder & Sons Co.**, New York City • **Southeastern Electric Supply Corp.**, Richmond • **Walter E. Thompson Co.**, Birmingham • **Triangle Electric Supply Co.**, El Paso • **United Electric Supply Co.**, Salt Lake City • **J. H. Warrington**, Lexington • **Williamson Sales Co.**, Shreveport, Amarillo, Beaumont, Corpus Christi, Dallas, Houston, Jackson, New Orleans, Pine Bluff, San Antonio, Tulsa

the O.Z. SHURELUG

has more of the features you want...

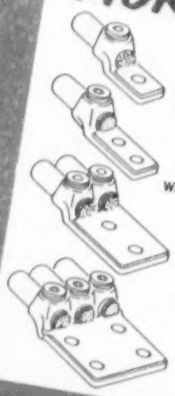
O.Z. means more for you

The O. Z. ShureLug is the newest addition to the complete O. Z. line of electrical fittings; more proof of O. Z.'s policy to make available dependable products at realistic prices.

MORE SIZES

The new O. Z. ShureLug is available for a wide range of sizes, including "in between" sizes usually found only in more expensive makes. This means that whether the job calls for #14 sol. or 1000 MCM cable, there will be an O. Z. ShureLug that will meet your needs more closely, more exactly, for a more secure, more dependable connection.

MORE MODELS



Here's variety too!: O. Z. ShureLug is available in single barrel, double barrel, and triple barrel models . . . with socket heads or hex heads . . . in single hole, double hole, and four hole styles, depending upon sizes selected. Here again, premium selection at practical prices!

MORE ECONOMY

O. Z. ShureLugs are priced no higher than other competitive brands, but you get so much more! Because O. Z. ShureLug is made in more sizes, more models, you buy only the capacity you actually need . . . only the capacity that you'll actually use. Why spend more for over-sized lugs when O. Z. has the size you want, the model you need, at the low economical prices you want to pay?

O.Z. ELECTRICAL MANUFACTURING CO., INC.

262 BOND STREET • BROOKLYN 17, N. Y.

Sales Office and Warehouse: 406 So. Cicero Avenue, Chicago 44, Ill.
Office and Factory: 749 Bryant Street, San Francisco 7, Calif.

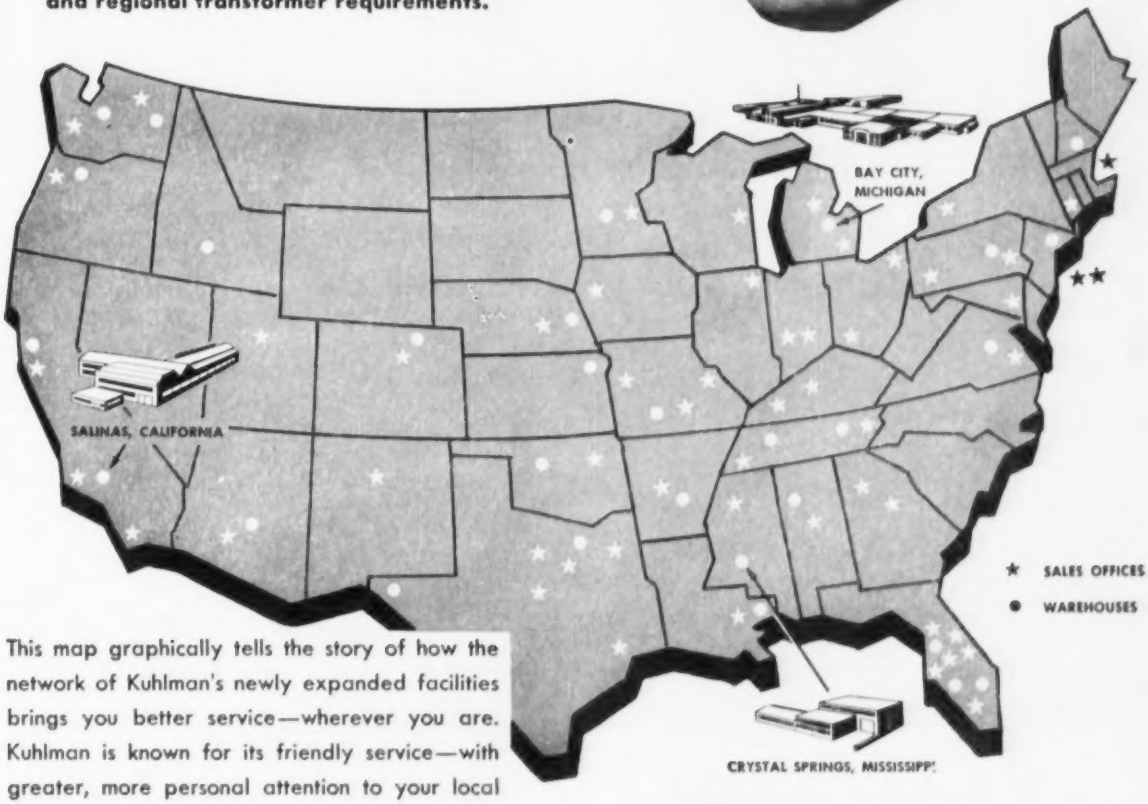
CAST IRON BOXES
CABLE TERMINATORS
POWER CONNECTORS
SOLDERLESS CONNECTORS
GROUNDING DEVICES
CONDUIT FITTINGS

KUHLMAN *"Salesman of the Week"*

If you can identify this Kuhlman Electric Co. representative, and are the first one to notify dept. SA-1, Kuhlman Electric Co., Bay City, Mich., you will receive a valuable gift certificate. Each week a different Kuhlman representative is featured . . . watch for the next Kuhlman "Salesman of the Week."

"WE'LL SERVE YOU BETTER . . . WHEREVER YOU ARE"

Kuhlman's 3 Regional Factories . . . 55 Sales Offices . . . 29 Distributing Centers are strategically located to meet your national and regional transformer requirements.



This map graphically tells the story of how the network of Kuhlman's newly expanded facilities brings you better service—wherever you are. Kuhlman is known for its friendly service—with greater, more personal attention to your local and regional requirements. It is this type of service that helps create the ever-increasing demand for Kuhlman transformers. Ask your friendly Kuhlman representative about the new Kuhlman facilities in your area.

576c

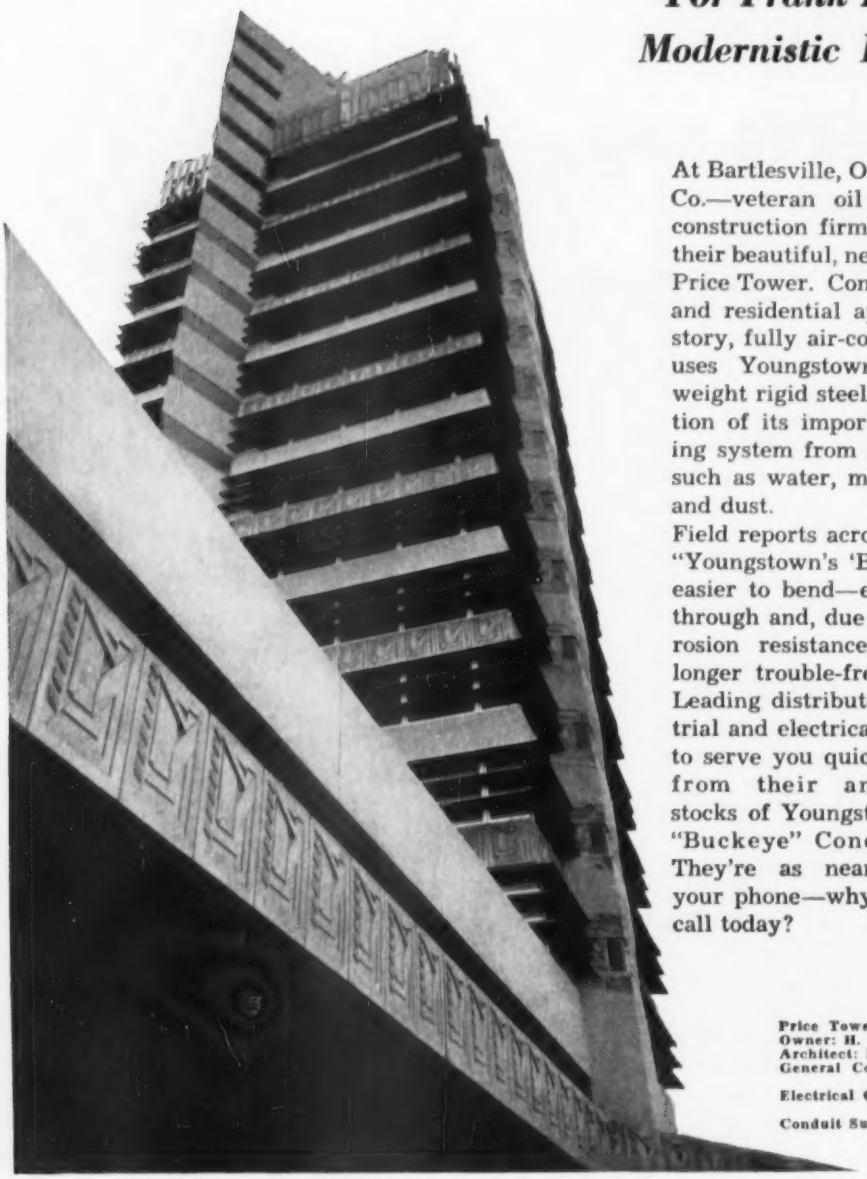
KUHLMAN
ELECTRIC COMPANY

BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA

Distributed By MAYDWELL & HARTZELL, INC. • SEATTLE • SPOKANE • PORTLAND • SAN FRANCISCO • LOS ANGELES • SAN DIEGO • PHOENIX

YOUNGSTOWN "BUCKEYE" CONDUIT

. . . Provides Lifetime Wiring Protection For Frank Lloyd Wright's Modernistic Price Tower



At Bartlesville, Okla., the H. C. Price Co.—veteran oil and gas pipeline construction firm — recently opened their beautiful, new cantilever-design Price Tower. Containing both offices and residential apartments, this 19-story, fully air-conditioned structure uses Youngstown "Buckeye" full-weight rigid steel conduit for protection of its important electrical wiring system from damaging elements such as water, moisture, vapor, dirt and dust.

Field reports across-the-nation state: "Youngstown's 'Buckeye' Conduit is easier to bend—easier to fish wires through and, due to its superior corrosion resistance, affords a much longer trouble-free service life."

Leading distributors in every industrial and electrical market are ready to serve you quickly and efficiently from their ample stocks of Youngstown "Buckeye" Conduit. They're as near as your phone—why not call today?

QUALITY YOUNGSTOWN SERVICE

Price Tower, Bartlesville, Okla.
Owner: H. C. Price Co.
Architect: Frank Lloyd Wright
General Contractor: Culwell Construction Co., Oklahoma City, Okla.
Electrical Contractor: Industrial Electric Co., Oklahoma City, Okla.
Conduit Supplier: Westinghouse Electric Supply Co., Oklahoma City, Okla.

Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

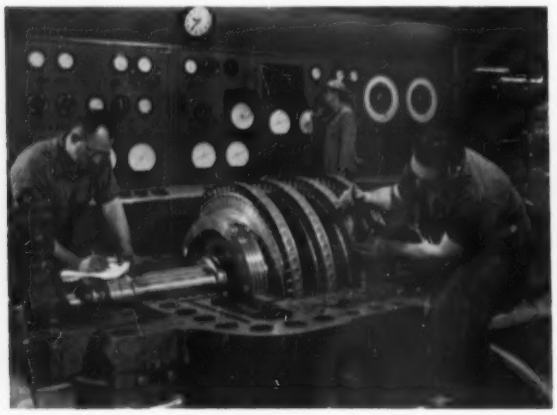
To help find answers to your power generation problems before they occur

TURBINE-GENERATOR TESTING PROGRAMS are co-ordinated in G.E.'s Turbine-Generator Development Laboratory.

Tomorrow's problems are explored today

IN GENERAL ELECTRIC'S TURBINE-GENERATOR DEVELOPMENT LABORATORY

Full-size turbine and generator parts and a great variety of development setups can be tested and evaluated for service performance at General Electric's Turbine-Generator Development Laboratory. Especially designed testing equipment—some described briefly on these pages—provides answers and engineering data that could not possibly be obtained before. This Laboratory, now in full operation, is of vital importance to all large steam turbine-generator development engineering. It supplements the Large Steam Turbine-Generator Department's Materials and Processes, and Air Test Laboratories.

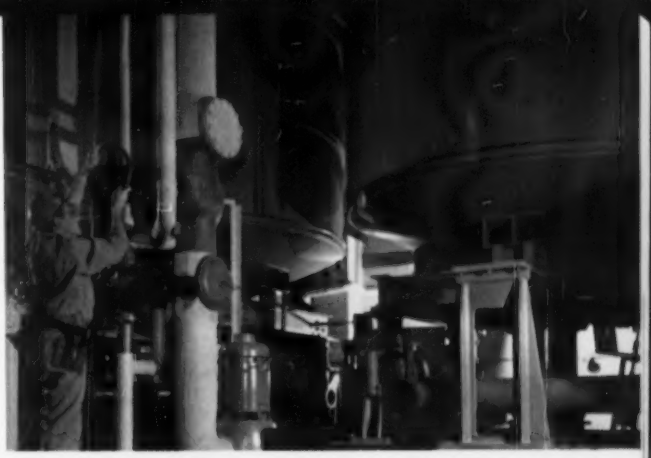


INCREASE TURBINE EFFICIENCIES—High-pressure test turbine provides precise operating data on new bucket, nozzle, rotor and shell designs, leading to higher efficiencies.

HIGH-SPEED BURST PIT shown on preceding page spins turbine and generator rotor cross sections and reveals fracture characteristics and effects of physical configurations.

INCREASE GENERATOR RATINGS—To increase generator ratings without great physical size increase, more effective dissipation of heat must be provided by improvements in the fans and the cooling systems. Prototypes of fans designed to cool higher-rated generators are run in this full-scale fan test setup. A new fan is being tested here for a 300,000-kw unit. Pressure-volume characteristics and efficiency can be determined—information vitally needed for good fan design.

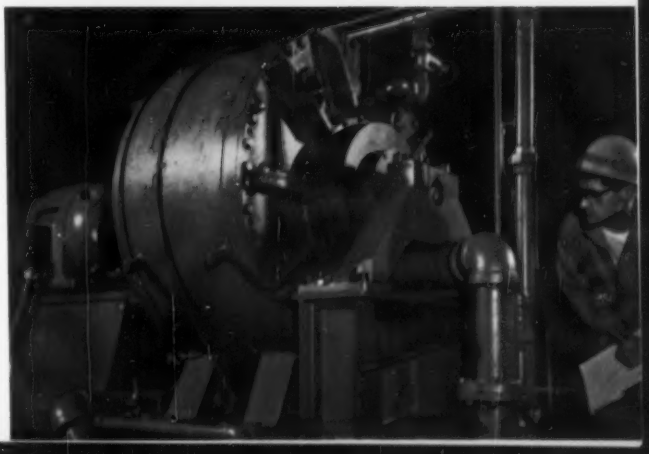
DETERMINE TURBINE EFFICIENCY—Accurate determination of overall efficiencies of new turbine designs is one of the most important considerations in building future turbines. And an inherent part of this problem is the development of more accurate flow nozzles. Here, the calibration of a water flow nozzle is being checked, using large, highly accurate scales and weigh tanks.



IMPROVE THRUST BEARING DEPENDABILITY—Thrust bearings of larger capacity are required for the larger turbines being designed. The machine shown here is used to test new thrust bearing designs. Operating at 1800 or 3600-rpm, it can impose loads up to 450,000 lbs—equivalent to the weight of the Statue of Liberty. It is also used to measure oil and babbit temperatures, and oil film pressures and thicknesses under conditions tougher than those encountered in actual operation. This machine has proved the dependability of General Electric thrust bearings.

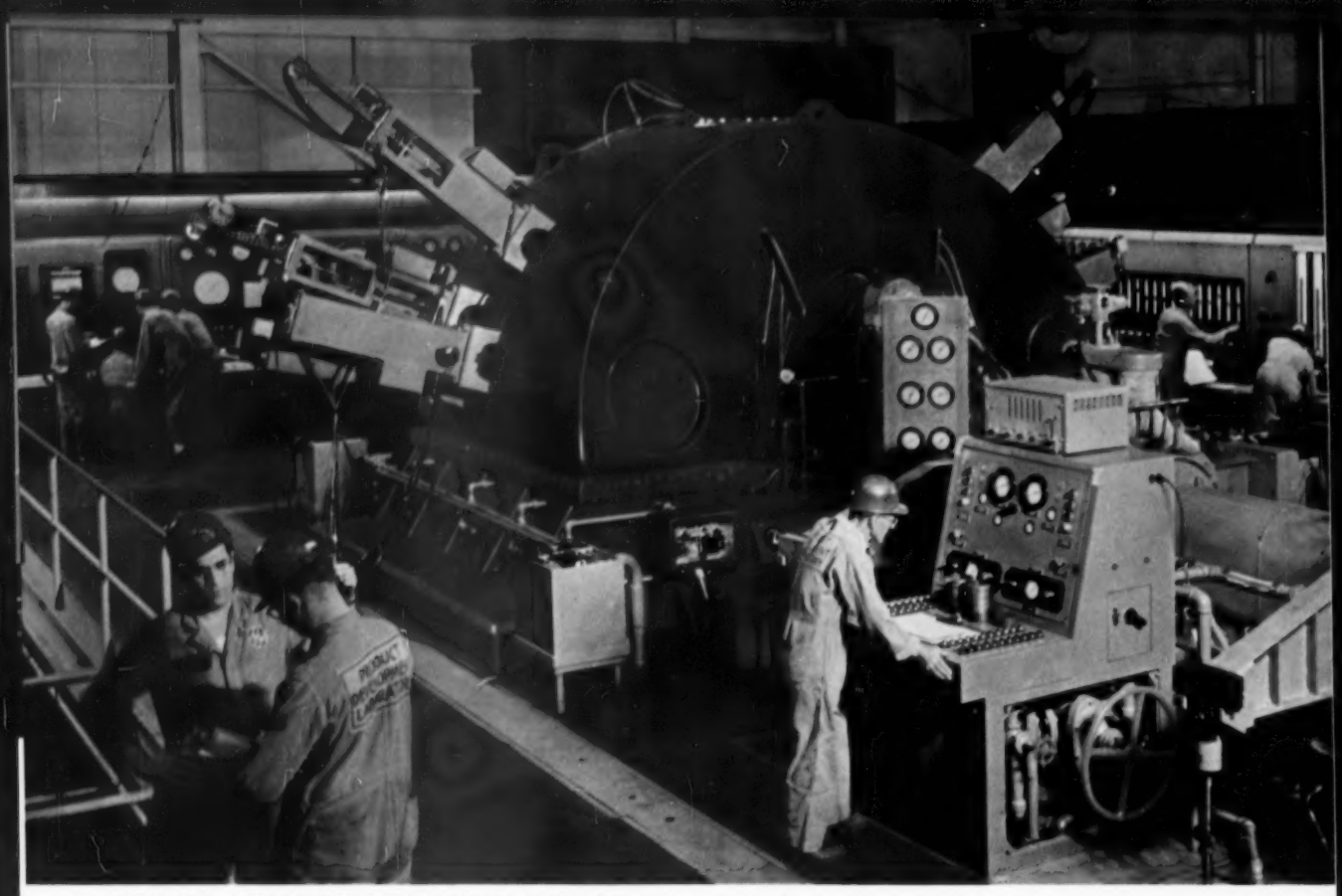
INCREASE GENERATOR INSULATION LIFE—Insulation is one of the most important factors affecting the life of a generator. That is why General Electric conducts extensive research aimed at prolonging insulation life. On this special "girth crack" test setup, a generator stator bar is subjected to simulated operating conditions. Thermal expansion is duplicated and ten years of operating cycles are condensed into four months of testing. Engineers can study and design new insulation systems that will reduce operating difficulties.

SIMPLIFY HYDROGEN SYSTEM—With this test set up General Electric engineers are working to develop a new shaft seal to permit the application of the continuous scavenging system on all generators regardless of size. This system requires no vacuum treatment of the oil.



Progress Is Our Most Important Product

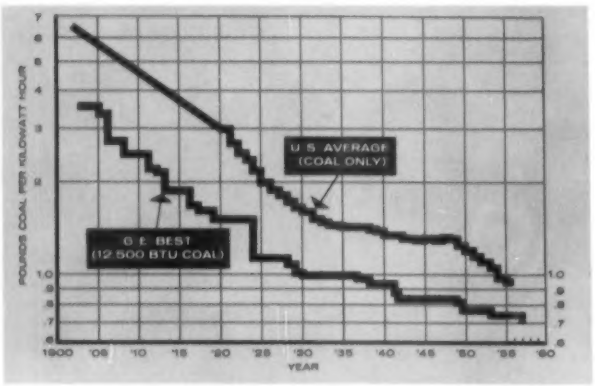
GENERAL ELECTRIC



FULL-SCALE, LOW-PRESSURE TEST TURBINE enables G-E engineers to evaluate new design concepts and to study turbine steam paths under actual operating conditions.

IN GENERAL ELECTRIC'S DEVELOPMENT LAB

Low-pressure turbines get critical study



STATION COAL RATE chart shows rapid progress in electrical equipment efficiency. U.S. average is from FPC reports, compared with station coal rates for G.E.'s most efficient units.

As the rating of steam turbines has continued to increase, a greater proportion of a unit's output is being produced by the low-pressure section. In addition, the advent of nuclear power has further established the importance of efficient use of the energy in this region.

The solution to problems in the low-pressure section can be evaluated in the Turbine-Generator Development Laboratory's full scale, low-pressure test turbine. Here the largest 3600-rpm turbine parts built by General Electric can be run under actual operation conditions.

With facilities like these, G-E engineers can solve power generation problems before they occur—so that tomorrow's turbine-generators will be even more efficient. For more information write for bulletin GED-2554, Large Steam Turbine-Generator Dept. General Electric Co., Schenectady 5, N.Y. 254-47

Progress Is Our Most Important Product

GENERAL ELECTRIC

B-M

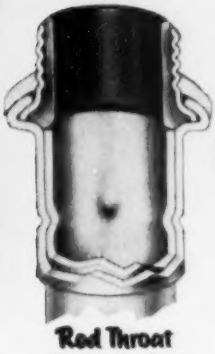
the original concrete-tight **INDENTER FITTINGS** *for E.M.T.*

Red Throat
Insulated Connector

"BM" #100
Cutter for ½, ¾ and 1" E.M.T.

"BM" #1000
Holder for ½, ¾ and 1" E.M.T.

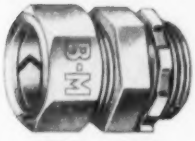
"BM" #607
½" Indenter



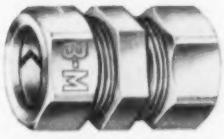
Red Throat
Cross section

"BM" #600
Changeable Jaw Indenter

Briegel Rain-Tight E.M.T. Compression Fittings



SIZES FROM
½" to 2"



SIZES FROM
½" to 2"

SIZES
½", ¾", 1"

SIZES
½", ¾", 1", 1¼"

Briegel Representatives from Coast to Coast

J. H. Akerman
813 Sistina Avenue
Coral Gables 46, Florida
Phone: Mohawk 7-3864

Harry C. Andrews Co.
5440 Gravois Avenue
St. Louis 16, Missouri
Phone: Hudson 1-7373

Crescent Electric Sales Co.
1800 N. Humboldt Blvd.
Chicago 47, Illinois
Phone: Albany 2-2600

R. L. Cunningham Electric Co.
843 South Front Street
Philadelphia 47, Pennsylvania
Phone: Lombard 3-3660 & 3-3109

L. J. Crews
1725 Arlington Road
Richmond 20, Virginia
Phone: 4-2273

Curtis Sales Corporation
3231 Warrenville Center Rd.
Shaker Heights 22, Ohio
Phone: Skyline 2-0225

Herbert L. Jones
745 Ohio River Blvd.
Pittsburgh 2, Pennsylvania
Phone: Linden 1-6684

Al Levin & Associates, Inc.
1200 So. Peters Street
New Orleans, Louisiana
Phone: Tulane 8480 & 8489

H. A. Maggiore & Son
15 Carleton Street
Cambridge 42, Mass.
Phone: Kirkland 7-4954

Ernst F. Hauch Co.
1282 Folsom Street
San Francisco 3, California
Phone: Hemlock 1-1828

R. C. Handy Sales Co.
4811 Excelsior Blvd.
Minneapolis, Minnesota
Phone: WAlnut 6-2939

L. D. Hood Sales
1133 West 8th Avenue
Denver, Colorado
Phone: Acoma 2-8001

A. Lee Clifford
1801 West 18th
Indianapolis 7, Indiana
Phone: Melrose 6-4449

Walter S. Nash
2101 Tula Street, N.W.
Atlanta, Georgia
Phone: Elgin 8071

Rutkin Electrical Sales Co.
935 Stanford Avenue
Los Angeles 21, California
Phone: Tucker 1224 & 5

Valkus-Kissel
1711 Kelly Street
Dallas 1, Texas
Phone: Hamilton 8-7388

W. W. Wheat & Son
2219 4th Avenue
Seattle 1, Washington
Phone: Seneca 6222

Arnold J. Young Co.
12600 Hamilton Avenue
Highland Park 3, Michigan
Phone: Townsend 9-5080 & 1

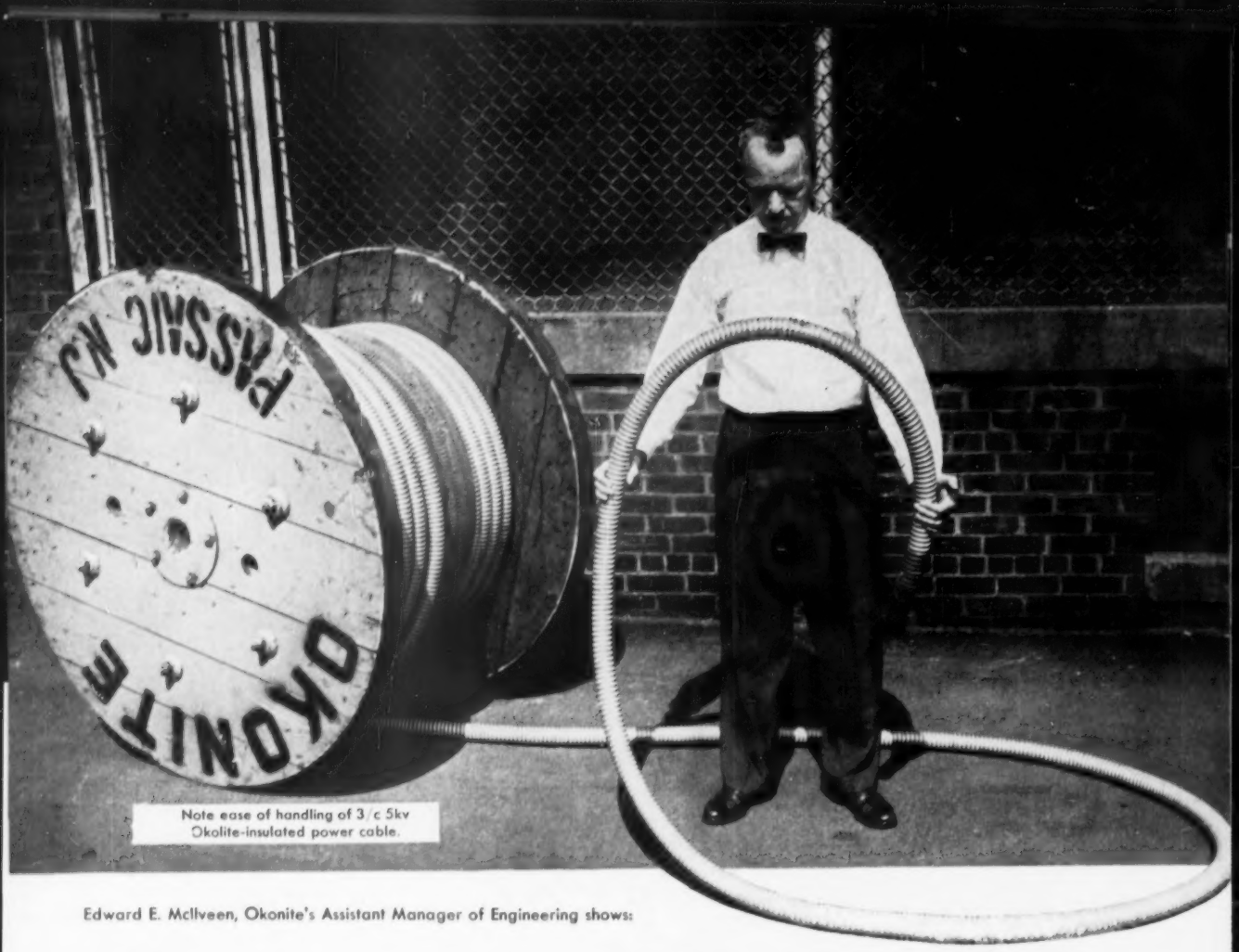
E. J. Martin Company
150 Nassau Street
New York 38, New York
Phone: Worth 4-6270

All B-M Indenter Fittings are U.L. Approved as concrete-tight and all Compression Fittings as rain-tight as well as for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

BRIEGEL METHOD TOOL CO.

GALVA, • ILLINOIS

SOLD ONLY THROUGH ELECTRICAL WHOLESALERS



Note ease of handling of 3/c 5kv Okolite-insulated power cable.

Edward E. McIlveen, Okonite's Assistant Manager of Engineering shows:

Why Loxarmor is the low cost alternative to conduit

Rubber-insulated Loxarmor Interlocking S-shaped armor cables provide an ideal combination of flexibility, light weight and mechanical strength. Where rigid conduit is not desired, Loxarmor is the No. 1 alternative for either power or control circuits. Here's why:

Material and installation costs are lower. Eliminates conduit and related installation procedures such as making bends and using pull boxes. It is especially useful in cramped quarters.

Circuits are easily added or re-routed—usually trained in trays or racks, Loxarmor cables can be easily moved.

Easy accessibility reduces down-time—permits quick inspection. Can be installed indoors and outdoors.

Loxarmor occupies less space—not much more than half the space is required for multiple Loxarmor circuits vs. circuits in conduit.

Loxarmor can be supplied with the strip-insulated insulations Okolite oil-base or Okonex butyl-base; with extruded Keystone or Watertite insulations; or with varnished cambric—all depending upon your installation conditions and voltage requirements.

Loxarmor is available in galvanized or stainless steel, aluminum, bronze or copper armor. May be obtained with either copper or aluminum conductors. For further information write for Bulletin WE-1090. The Okonite Company, Passaic, N. J.

where there's electrical power . . . there's **OKONITE CABLE**

4161

Warranty

"Hubbard & Company warrants this Autogap lightning arrester against failure resulting from defective material or workmanship for a period of five years and will provide a new unit without charge upon return of the defective unit within such period. This warranty, however, does not include replacement labor costs or consequential damages of any kind."

Now warranted for 5 years

The Hubbard Autogap Lightning Arrester

Since their introduction 15 years ago, Hubbard Autogaps have established remarkable performance records in every state, under every type of weather and storm.

On the basis of this outstanding service record . . . unapproached by any other lightning arrester . . . Hubbard now offers a 5 year warranty with every Autogap sold. Details of this offer are outlined in the insert shown above.

This warranty is possible because of the efficient design of Hubbard Autogaps. The exclusive dual exhaust dissipates extreme pressures harmlessly and quickly. And, the Hubbard Autogap permits surges to be discharged over an infinite number of paths along a cylindrical barrier plug . . . thus preventing the burning and consequent loss of efficiency caused by the usual method in which the discharge follows the *same* path each time the arrester operates.

Impartial tests, conducted by utilities as well as by an independent research laboratory, have proved Autogaps to be superior to any other lightning arrester on the market.

If you're not already among the many who have Hubbard Autogaps in service, call a Hubbard distributor or Hubbard representative and investigate the real economies and protection you too can get with the Hubbard Autogap.

HUBBARD AND COMPANY

Pittsburgh 1, Pa.
Chicago 50, Ill.
Oakland 8, Cal.

Utilities can save up to 75% in soundproofing

with new Westinghouse power transformers

Westinghouse announces drastic reduction in premium costs paid for transformers with lower than standard sound levels. Extensive improvements in manufacture and application of materials have created spectacular new performance available to all users of Westinghouse power transformers. Noise levels can now be reduced for much less cost.

Westinghouse power transformers—already smaller and lighter per kva than transformers of any other design or manufacture—will achieve lower sound levels and promise to show even greater advantage in weight and size comparisons. Here is new performance available for all new purchases of Westinghouse transformers—501 kva up to the world's highest capacity three-phase units.

So here's new help—especially in planning substations where increasing population densities are making transformer noise a real problem. This is welcome news, too, for noise-sensitive areas such as schools and hospitals. In addition to investment savings and improved public relations, consider the advantages of new flexibility in interchange of equipment, and new ease in obtaining rights of way and substation sites.

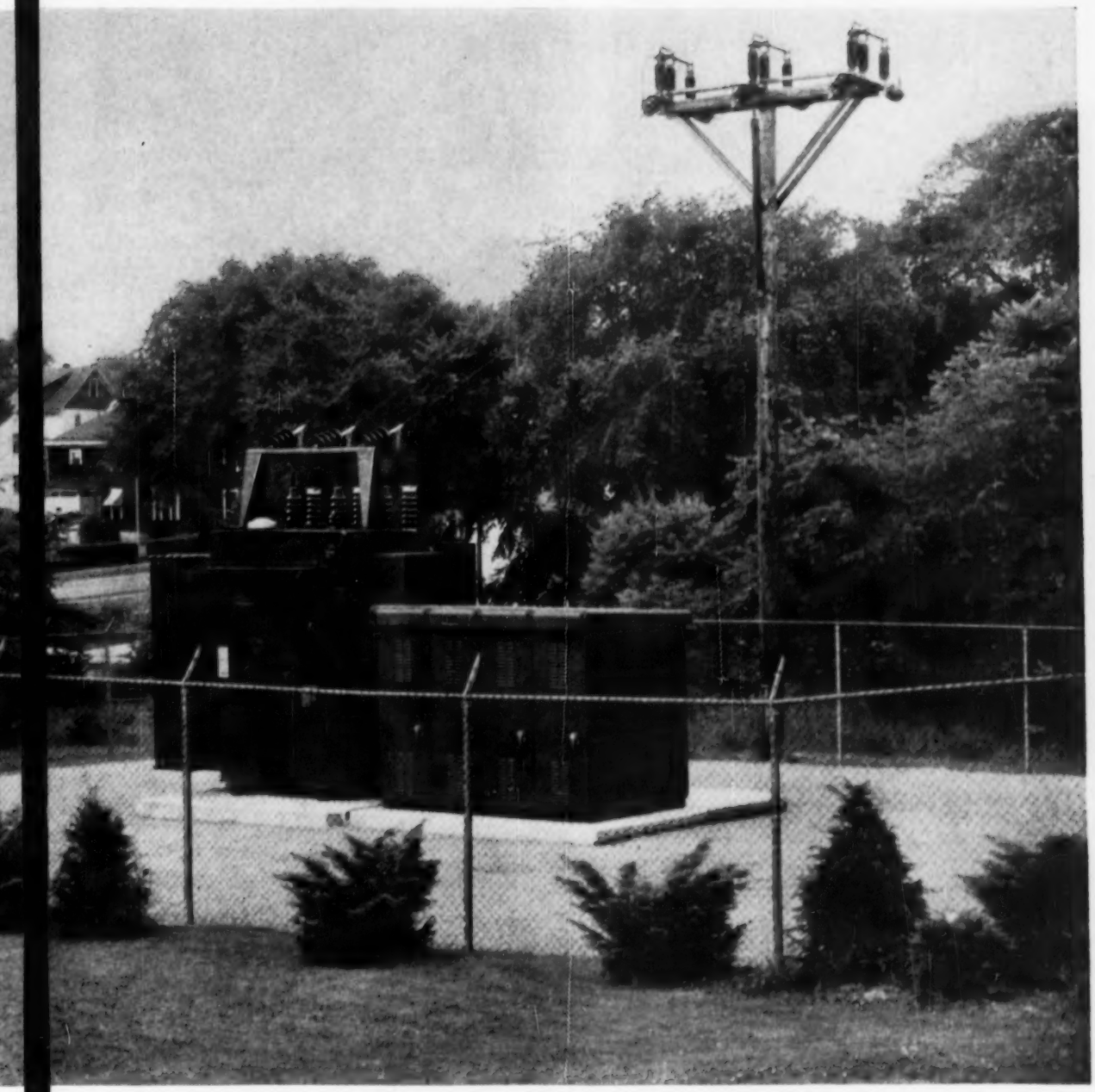
Anticipated power transformer purchases over the next five years total 300,000,000 kva. Based on this figure, reduction in soundproofing "extras" can reach $30,000,000. This is the performance Westinghouse can deliver—with all new power transformers.

For the full story, call your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-70785

Westinghouse now offers you a $11,730 saving on equipment ordinarily invested to cut transformer noise at a typical 10,000 kva neighborhood substation such as this . . . a saving equal to 25% of total equipment cost.

YOU CAN BE SURE...IF IT'S

Westinghouse®



RECOMMENDED NEMA SOUND LEVEL DB.	PER CENT PRICE ADDITIONS FOR REDUCTION IN RECOMMENDED NEMA SOUND LEVEL OF									
	3 DB.		6 DB.		9 DB.		12 DB.		15 DB.	
	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW
56 to 60	22	6	41	9	—	—	—	—	—	—
61 to 65	14	5	25	7	55	14	—	—	—	—
66 to 70	8	4	15	5	35	10	—	—	—	—
71 to 75	4.5	3	9	4	20	7	35	14	—	—
76 to 80	2.5	2	5.5	3	11	5	19	10	39	20
81 to 85	2	1	3.5	2	6	3	12	6	23	12
86 to 95	—	1	—	1	—	2	—	4	—	8

Drastic reductions in sound levels offered with all new Westinghouse Transformers make possible the above reduction in premiums previously necessary to achieve these same levels.

TOMIC *Solves* ANOTHER TOUGH PROBLEM
. . . AND SAVES YOU MONEY!

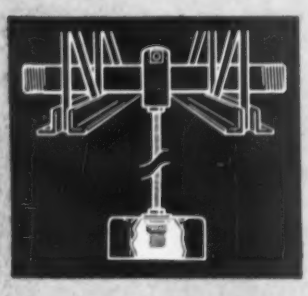
PAT. PENDING

Here's the Answer for Hanging Fixtures from Suspended Ceilings at Lower Cost!

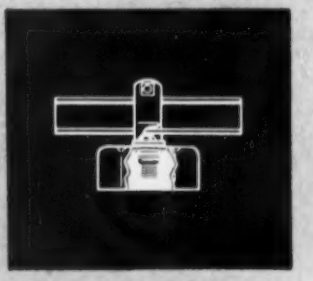
TOMIC ADAPTA-STUDS

NO. 711A-¼" **NO. 711B-⅜"**

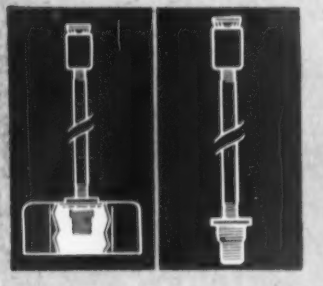
Only one ½" locknut required to secure box. Universal application . . . simplifies transition or conversion from ¼" or ⅜" threaded rod or bolt to fixture stem.



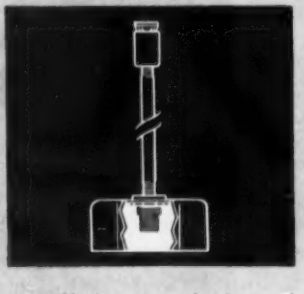
Hanging from bar joists.



Hanging from ceiling channels.



Continuous row stem fixtures. Tremendous advantage for this application.



Hanging from concrete. Removes all stress and weight from box and suspended ceilings.

ONLY WITH ADAPTA-STUDS do you get all these exclusive advantages . . . guaranteeing a quicker, easier, better installation at LOWER COST.

TOMIC SALES and ENGINEERING CO.
20,000 SHERWOOD AVE.
DETROIT 34, MICH.

Please send me a free sample and data on Tomic Adapta-Studs.

NAME_____

ADDRESS_____

CITY_____ STATE_____

Write for Free Sample.

TOMIC SALES & ENGINEERING CO.

ORIGINATORS and Manufacturers of Famous TAP-ON Fittings
20,000 Sherwood Ave. • Detroit 34, Michigan

CONGRATULATIONS!

to the American Telephone & Telegraph Co. and the people of the Pacific Northwest!

. . . on the completion of the first underwater telephone cable which directly links the United States with Alaska.

We extend our heartiest congratulations and best wishes to the people of the Pacific Northwest who will benefit for years to come from the just-completed telephone linkage between the United States and Alaska.

Twin telephone cables now extend underwater from Port Angeles to Ketchikan, Alaska, and a single cable extends from there to Skagway. Total cable length is approximately 2,000 miles.

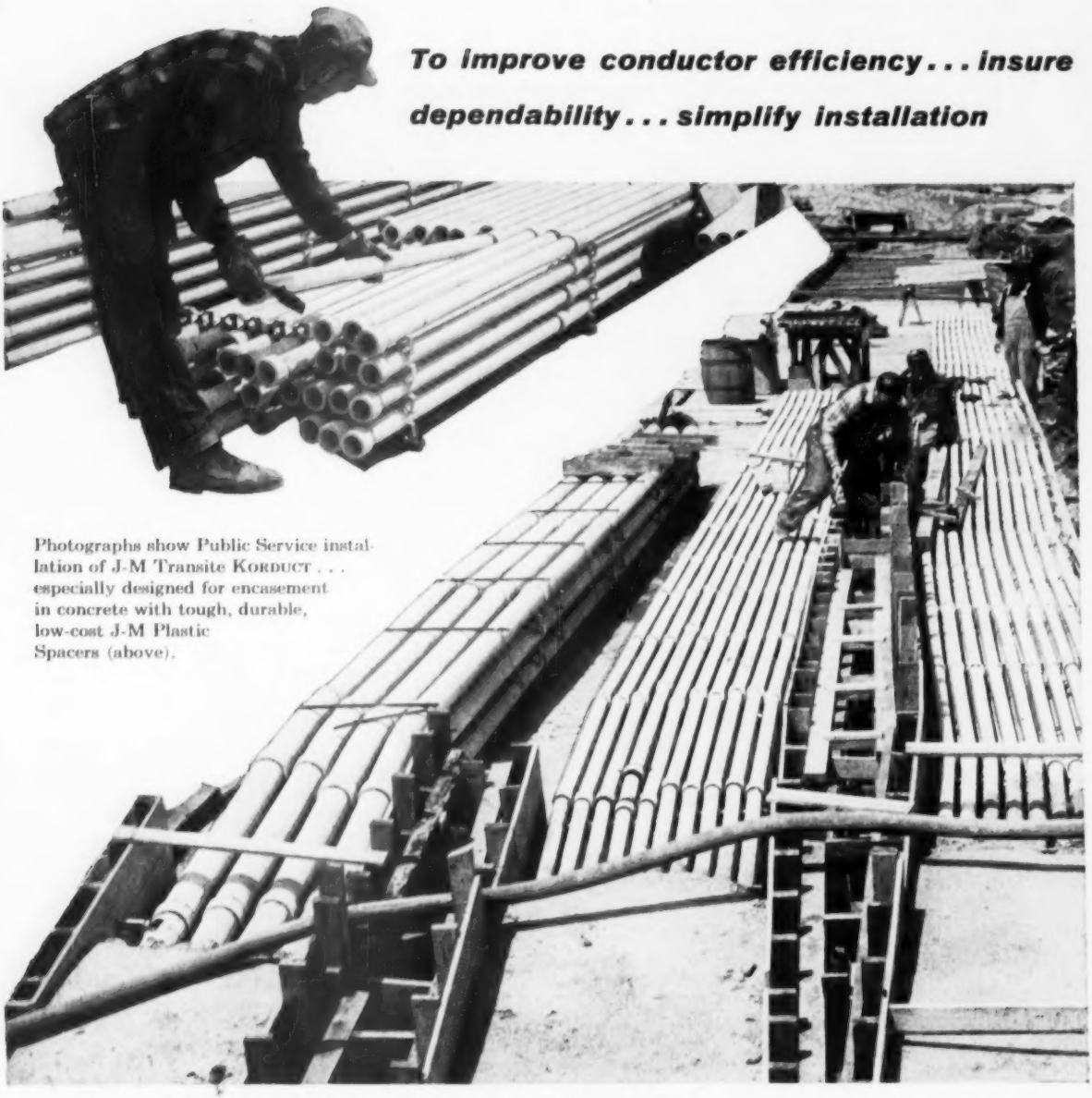
We salute the American Telephone and Telegraph Company on this most noteworthy achievement. Simplex, as sole manufacturer and supplier of the cable used, is proud to have played a part in this historic engineering accomplishment.

Simplex
WIRE & CABLE CO.
Cambridge, Massachusetts

Manufacturers of complete lines of insulated wire and cable for industry

Simplex Wire & Cable Co.
Los Angeles • San Francisco
Portland • Seattle • Phoenix

To improve conductor efficiency . . . insure dependability . . . simplify installation



Photographs show Public Service installation of J-M Transite KORDUCT . . . especially designed for encasement in concrete with tough, durable, low-cost J-M Plastic Spacers (above).

Public Service of New Jersey chooses Transite asbestos-cement Ducts

Economical Transite Ducts are part of Public Service Electric and Gas Company of New Jersey's plan for top operational efficiency at the new Linden Generating Station. With Transite Ducts on power circuits, current-carrying capacities are higher . . . copper losses lower . . . because Transite dissipates heat faster than organic ducts.

Johns-Manville Transite Ducts protect control circuits permanently. Transite will never rot, rust or corrode, is incombustible and non-inductive, because it is made of asbestos and cement.

Transite is easy to install . . . light, 10-foot lengths require fewer joints . . . direction changes are easy with the wide variety of Standard Transite fittings. And the unusually smooth bore permits easy cable pull-through and prevents injury to cable sheath.

• • •

For complete information on Transite Ducts, write to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

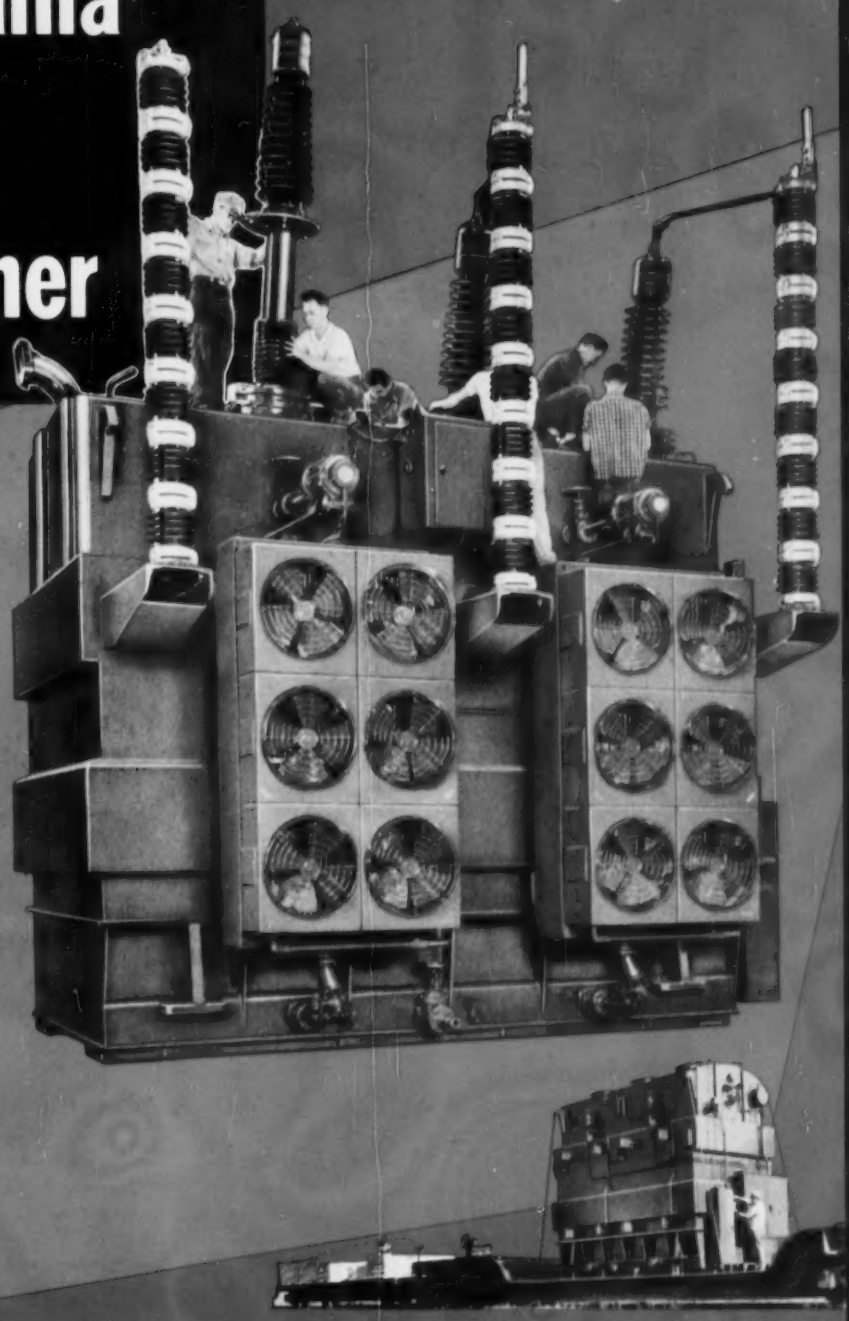
Johns-Manville TRANSITE® DUCTS

CONDUIT for exposed work and installation underground without concrete encasement

KORDUCT® for installation in concrete

140,000 Kva Pennsylvania Power Transformer

THREE PHASE CONTOUR DESIGN



140,000 Kva, 115 Kv, is the rating of this main step-up generating station transformer. Completely assembled except for bushings and coolers, it traveled by train to its destination in an upright position. This simplified the matter of installation and saved time and money for the utility. Pennsylvania's space-saving, shell form, Contour Design construction made this type of shipment and installation possible. Although it has a large Kva capacity, only 9000 gallons of oil are required to cool the transformer through four oil-to-air heat exchangers.

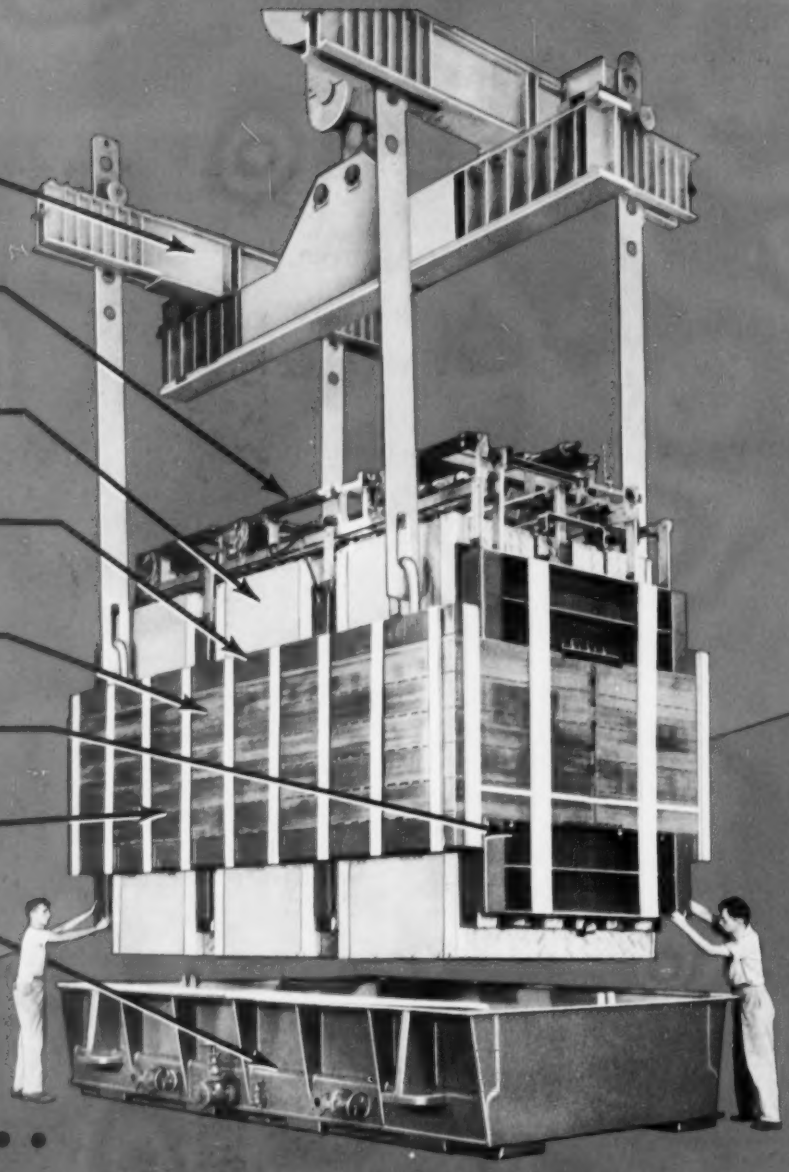
pt

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division

CANONSBURG, PENNSYLVANIA • *Greater Pittsburgh District*

SEE NEXT PAGE FOR INSIDE STORY



Core and coil assembly being lowered into bottom tank section by Pennsylvania's 165-ton crane.

Straight line tap changer with silver alloy contacts is located above the core and coils where it is accessible through manholes for inspection and maintenance.

Vertical cooling ducts in the coils permit a free flow of oil through the coils for most efficient cooling.

Core and coils clamped together with heavy steel frames to form a rigid structure.

Core and coil unit can be handled separately as a complete sub-assembly.

Heavy box sections form part of core frame and clamp coils against mechanical forces during short circuits.

Core cooled by both vertical and horizontal ducts.

Core and coil assembly rests on bottom section of Contour Design tank.

Inside a . . .

140,000 Kva THREE PHASE CONTOUR DESIGN

Pennsylvania Power Transformer

140,000 Kva, Three Phase, 60 Cycles, 55° C. Temperature Rise.
High voltage: 115,000 Grd.Y/66,400 volts. Low voltage: 14,700Δ volts.

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division

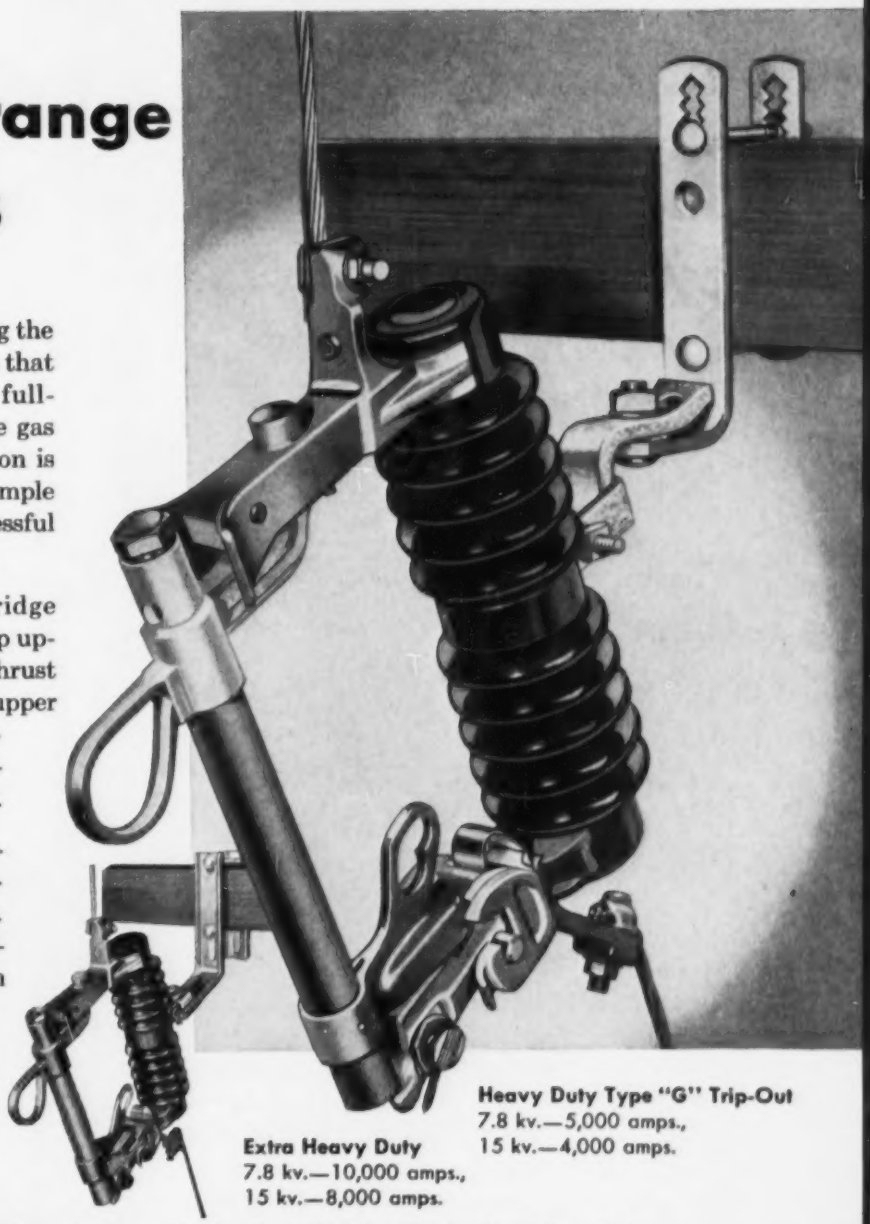
CANONSBURG, PENNSYLVANIA • *Greater Pittsburgh District*

For exterior view of this transformer, see other side.

KEARNEY

Type "G" TRIP-OUT Design

assures full-range interruptions



It's the original method of venting the gasses at the top of the cartridge that does it . . . plus the exclusive full-floating upper contact! Adequate gas relief for high current interruption is provided by the top vent—yet ample pressure is developed for successful expulsion on low-fault currents.

During arc interruption, cartridge recoil from top gas jet acts to keep upper contacts closed. Cartridge thrust is absorbed by the full-floating upper contact (patented) which *maintains* contact until arc is extinguished and cartridge drops out.

All cartridges are interchangeable, and marked for quick identification of interrupting rating. Ratings and performance *field-proved* . . . at KEARNEY's own outdoor Substation!

JAMES R. KEARNEY CORPORATION
General Offices:
4224-42 Clayton Ave.,
ST. LOUIS 10, MO.

Extra Heavy Duty
7.8 kv.—10,000 amps.,
15 kv.—8,000 amps.

Heavy Duty Type "G" Trip-Out
7.8 kv.—5,000 amps.,
15 kv.—4,000 amps.

IN THE WEST: for prompt service, contact Kearney's West Coast Distributor, **Maydwell and Hartzell, Inc.,**
Los Angeles • Seattle • Portland • San Francisco • Spokane • Phoenix.

849-W

for BETTER CONSTRUCTION
SAFER MAINTENANCE
Specify KEARNEY

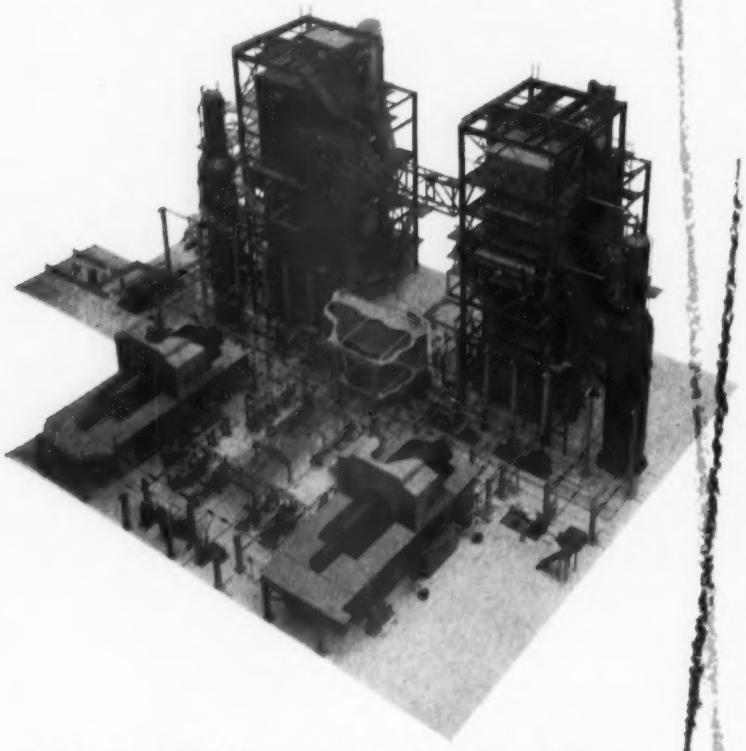
JAMES R. KEARNEY

The Mark of Quality PRODUCTS

Plants at: ST. LOUIS • FAYETTEVILLE, ARK. • SHENANDOAH & CLARINDA, IOWA—GUELPH, ONT., CANADA

EIGHT TANKS IN ONE

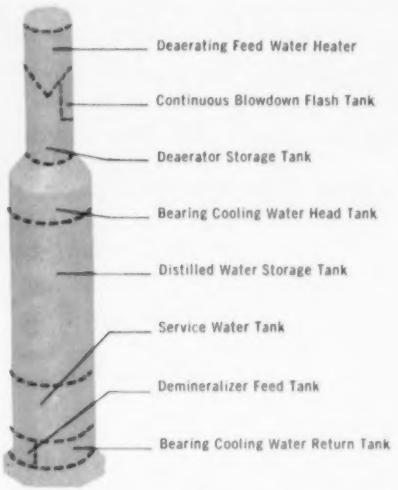
California Electric's new 120,000 KW power plant features advanced design



California Electric Power Company's new San Bernardino plant will consist of two 60,000 kw steam power units—both awarded as complete design-engineering-construction contracts to The Fluor Corporation, Ltd. Fluor recently completed for this same client a 140,000 kw steam power plant at Highgrove, California. Fluor offers the power industry a single, centralized responsibility plus the most advanced research, engineering and construction techniques. Why not get acquainted with Fluor's integrated services? Write for your copy of the Power Bulletin, *"Electric Power Plants."*

Trained to think in terms of the entire project rather than an individual service, the Fluor Corporation, Ltd.'s power plant designers developed such unique elements as the 8-in-1 tank for California Electric's new power plant.

In this outdoor plant of minimum area, the problem of locating the deaerating feed water heater and storage was solved by designing a vertical water storage unit to serve as its base. The final design was a streamlined tower consisting of eight separate and distinct chambers combined in one vertical tank.



Additional advantages of the San Bernardino plant include wide firing aisles (trucks can reach both boilers from a 16′ deck) . . . extremely compact flue and duct arrangement . . . centralized control room. The plant handles fuel oil without preheating.

When your plans for expansion call for steam, hydroelectric or nuclear power, the experience and integrated services of Fluor can serve you equally well. In single services or the entire project, Fluor is noted for the best plant value per dollar invested.

FLUOR *ENGINEERS and CONSTRUCTORS*
for the Petroleum, Chemical & Power Industries

The FLUOR CORPORATION, Ltd., Los Angeles – Mid-Continent Division, Houston – Research Division, Whittier, California – Fluor of Canada, Ltd., Toronto – Singmaster & Breyer, Inc., New York City

MEN RESPONSIBLE FOR

POWER DISTRIBUTION KNOW...

IF IT'S PARANITE IT'S RIGHT!®

FROM POWER TO CONTROL CABLE...

Paranite has earned an unquestioned reputation for quality wire products and dependable service! Overhead . . . or underground . . : there's a Paranite cable specifically engineered to perform in excess of your requirements. Super-Pararite® butyl rubber insulations have been developed to withstand conditions in *your* area. Copper or aluminum bare or weatherproof cables—ACSR or line wire (formerly products of Midland Wire Corporation) are available.

LIVE BETTER ELECTRICALLY

PARANITE WIRE AND CABLE

DIVISION ESSEX WIRE CORPORATION

Factory: Anaheim, California

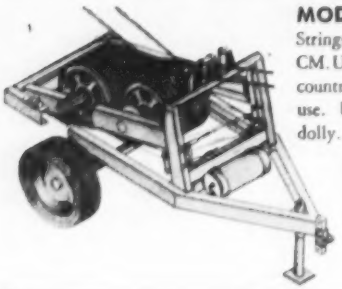
WAREHOUSES* AND SALES OFFICES

*LOS ANGELES, 6415 East Fleet Street; *SAN FRANCISCO, 1077 Howard Street; *PORTLAND, 525 North Tillamook Street

Partial showing of the now ***COMPLETE*** line of . . .

PENGO TENSION WIRE STRINGING EQUIPMENT

Manufactured by PETERSEN ENGINEERING CO., Santa Clara, Calif. • 14 Patents Pending.

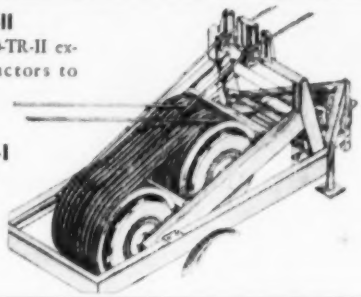


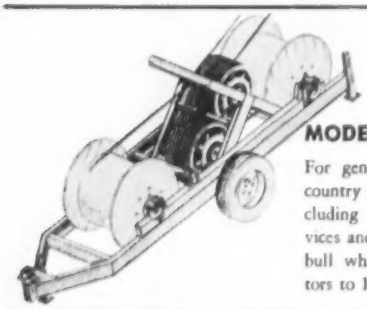
MODEL 5000-TR-II
Strings two conductors to 556,300 CM. Used primarily for very rough country work; also for general use. Use separate reel-carrying dolly.

MODEL 5000-TR-I
Similar except strings one conductor.

MODEL 6000-TR-II
Similar to Model 5000-TR-II except larger. Conductors to 1,272,000 CM.

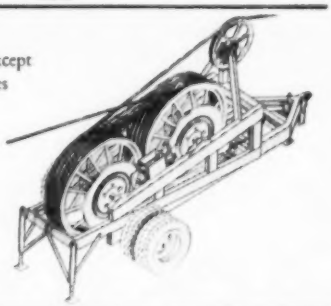
MODEL 6000-TR-I
Similar except for one conductor.

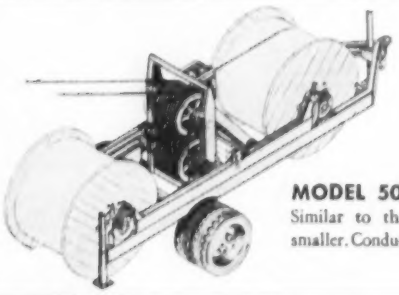




MODEL 6000-WS-TR
For general and medium rough country use. A complete unit including trailer, reel-carrying devices and its own double pair of bull wheels. Conductors to 1,272,000 CM.

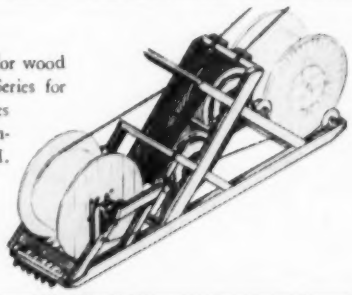
MODEL 7000-TR-I
Similar to model 6000-TR-I except larger. Conductors to 2 inches diameter.

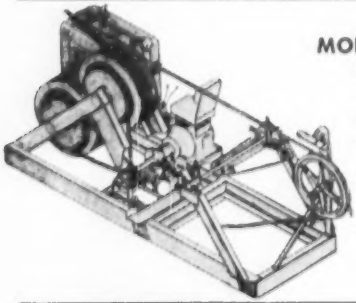




MODEL 5000-WS-TR
Similar to the 6000-WS-TR but smaller. Conductors to 556,300 CM.

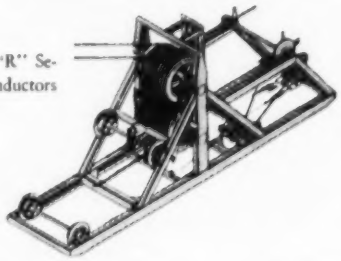
MODEL 6000-W
Available in "S" Series for wood or steel reels, in "R" Series for steel reels, or "SR" Series for trailer mounting. Conductors to 1,272,000 CM.

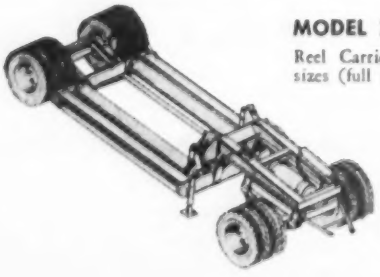




MODEL 6500
Bull Wheel Cable Puller. Available in "R" Series for steel reels, "S" Series for wood reels. Conductors to 1,272,000 CM. Also available in "LWR" Model for extra-large steel reels. Model 5500 similar (smaller).

MODEL 5000-SR
Available in "S" Series, "R" Series, or "SR" Series. Conductors to 556,300 CM





MODEL 7500
Reel Carrier. Takes the largest sizes (full range) of steel reels. Loads and unloads with one man. No auxiliary equipment needed except the truck that pulls it. For use with any one of the tensioning machines shown on this page.

ADDITIONAL MODELS NOT SHOWN

Tension Reel Trailers

MODELS 2, 3, and 4, Two-Wheel Straddle Dollies not shown. For use with any one of the tensioning machines shown on these pages.

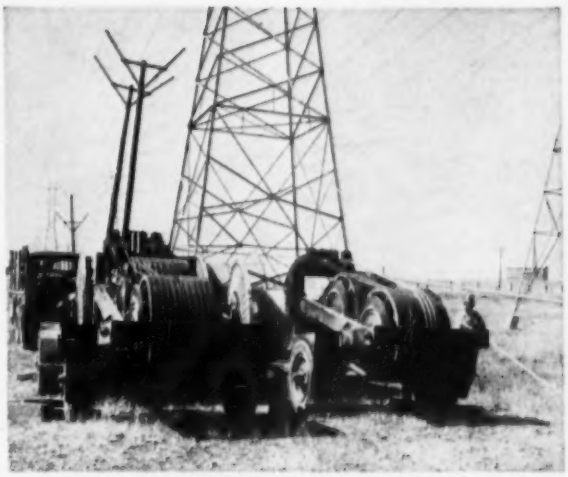
Tension Stringers

MODELS 6000-SK-I and 6000-SK-II For one or two conductors to 1,272,000 CM. Skid mounted for installation on owner's equipment.

MODELS 5000-SK-I and 5000-SK-II Skid mounted for installing on owner's equipment. For stringing one or two conductors to 556,300 CM.

MODEL 5000-WS-III Strings three conductors to 556,300 CM. For mounting on low-bed or full trailer.

MODEL 6000-WS-III Strings three conductors to 1,272,000 CM. For mounting on low-bed or full trailer.



Two PENGO model 6000 TR-II wire tensioners being used by Pacific Gas and Electric Co. in reconductoring job between Vacaville, Calif. and Cottonwood, Calif. 285 miles of 500 MCM copper is being replaced by 954 MCM aluminum in this operation.

Newest method of stringing overhead lines

Two PENGO model 6500 Bullwheel Cable Pullers used by Pacific Gas and Electric Co. for pulling in the new line on the job mentioned above. Unit, manned by an operator and one reel tender, pulls the pulling line (in this instance the old copper conductor) over the double neoprene lined Bullwheels and winds it for shipment in a single operation.

- **Safest, most economical way of stringing transmission, distribution and even secondary lines.**
- **Its greatest savings are effected when stringing over and through energized circuits . . . by far the safest, too!**
- **14 Patents pending.**

Smooth, postive control of conductor tension can be maintained at all times regardless of model or size of PENGO tensioning equipment used. The large, specially designed PENGO disc brakes are mounted away from the Bullwheels to assure dissipation of the heat generated by the continuous braking action and prevent transmission of the heat to the Bullwheels.

Note the wide range of models on the opposite page available for all types of jobs or terrain and for all sizes of conductor.

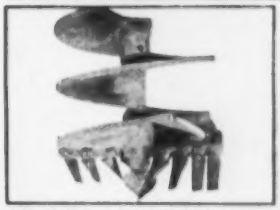
List your requirements and send for descriptive literature and prices.

Made by the makers of the World-Famous
PENGO EARTH AUGERS

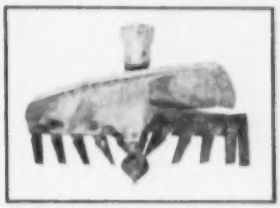
PETERSEN
ENGINEERING COMPANY
Santa Clara, Calif.

PETERSEN ENGINEERING CO.
Santa Clara, California Dept. 3
Please send me more information on the new Pengo wire stringing equipment.
Name_____
Firm_____
Address_____
City_____ State_____

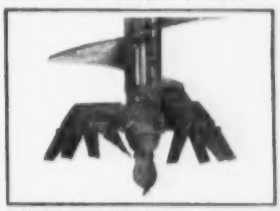
Other PENGO Products include:



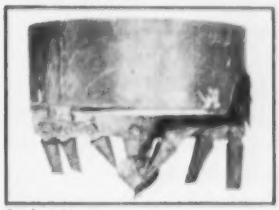
24 inch Heavy Duty Flight Auger



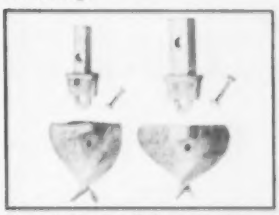
Double-Helix Heavy Duty Auger



Offset Boring Head

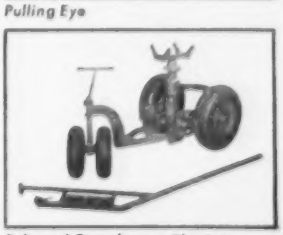


Bucket Auger



Screw Bit for Small Diameter Holes

Pulling Eye



Pole and Transformer Chariot

FLOW CONFIGURATIONS are observed in shadow box used with model of transverse section of new intercept valve in Air Test Lab of General Electric's Large Steam Turbine-Generator Dept. Erik Vohtz, Development Engineer, studies flow pattern existing at one particular valve position.

Turbine advances speeded by Air Test Lab

Aerodynamic studies accelerate new, improved steam turbine designs

Today's steam turbines operate at such high efficiencies that further improvements are made only through carefully planned research and development. At General Electric, the Air Test Laboratory is one of the most vital tools used for gathering data to speed the translation of new turbines' designs into practical applications.

UTILITY BENEFITS

A complete understanding of flow phenomena becomes increasingly important to effect greater economies available from increased turbine ratings, steam pressures and operating temperatures. Studies on nozzles, buckets and other turbine components conducted in the Air Test Lab contribute to this understanding. The results of this work are passed along as benefits in the form of more efficient turbine parts. For example, the axial exhaust hood, developed in the Air Test Lab, recovers a large part of the velocity energy leaving the last-stage buckets, and improves overall turbine performance about 0.4%. A recent study of a 200,000-kw unit incorporating this design indicated a possible evaluated fuel saving of $100,000.

NEW VALVE

One of the most significant studies now under way in the Air Test Lab is on a new intercept valve, which in addition to performing the normal functions of a valve, will separate out foreign materials. This program gives excellent promise of substantially reducing or eliminating the existing problem of foreign material damaging steam parts.

For information concerning the latest turbine advances, contact your General Electric Sales Office. General Electric Company, Section 301-287, Schenectady 5, New York.

MORE POWER TO AMERICA

GENERAL ELECTRIC

ELECTRICAL WEST

VOL. 118, NO. 2
FEBRUARY 1957

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

Utah Power & Light Co. Business Development Brochure

Industrial expenditures go up—opportunities expand — business tempo quickens — population zooms. It all adds up to a record-breaking pace for electrical utility expansion, giving the West

Its First Billion Dollar Budget

Western growth continues at an accelerated pace — a pace that is reflected in the existing commitments and future planning for electric power supply facilities in the 11 Western states. For the first time utility budgets of the region top the billion dollar annual rate. In 1957 budgets of the electric power supply agencies of the West reached $1.016 billion, up nearly 24% over the previous high set in 1956.

Population growth of the area continues to follow the predicted pattern (see chart) which indicates that the growth in the 11 Western states by 1975 will almost equal the population growth in the rest of the 37 states of the nation. The annual growth rate of nearly 1,000,000 new people per year is confirmed by the reported growth in electrical customers during the past 12 months. During 1956 over 325,000 new users came on the lines of the Western utilities, an increase of nearly 4.2% over the previous year.

This population growth likewise is reflected in the over-all construction program for the West. Figures from *Engineering News-Record* reveal that the 11 Western states account for 23.6% of the country's total backlog of proposed engineering construction. This Western backlog totals $26,332,439,000. One-third of this amount represents construction expenditures for private projects such as industrial and commercial buildings, utility facilities and similar projects but does not include domestic housing. Included in the public expenditures are schools, hospitals, shopping centers and other similar institutions, needed to meet the ever-expanding needs of the growing population, as well as federal expenditures for power, flood control and irrigation projects. At the present time, the 11 Western states, with barely 15% of the total population of the country, account for nearly one-quarter of the total major construction activities of the country.

Previous market studies reveal that for every dollar spent for utility expansion, there is approximately one dollar spent for wiring supplies, lighting equipment and other components of electrical circuits in the utilization area. On this basis, new and existing customers in the West may be expected very nearly to duplicate the billion dollar spending program on facilities to bring energy to points of use in the plants, stores, shops and homes of the region.

The 1957 budget figure of $1.016 billion represents reports from electric utilities representing over 94% of the total meters in the Western region. These expenditures will buy in part the system components shown in the accompanying table.

The total capacity additions planned for 1957, totaling 1,991,450 kw, compare to the 1,411,000 kw that were added to the systems in 1956. The latter addition brought the total generating capability of the 11 Western states to just over 22,000,000 kw.

This is not all of the story. Programmed additions for 1957 through 1962 total just over 14,000,000 kw of new capacity which will be added at 53 hydro sites and 34 heat cycle stations (see map, page 97). It will be noted that the heat cycle plants are concentrated largely in the Pacific Southwest and Intermountain regions.

Energy generated in the area jumped to over 113,000,000,000 kwh, an increase of almost exactly 10% over 1955. Due to an excellent water year, hydro stations accounted for 67% of this total. This growth in output is measured against a population growth of approximately 7% and a customer increase of 3.7%. No better indication could be asked for than this evidence of increasing utilization of electricity, individually and collectively, in the West.

Major System Components Scheduled for 1957

951,500 kw of steam plant capacity
1,039,950 kw of hydro capacity
2,960 miles of transmission lines
6,090 miles of distribution lines
7,230,000 kva of transmission substations
2,700,000 kva of distribution substation capacity

The West's Growth

Table I—Comparison of National to Western Operations for 1955 and 1956

	11 Western States 1955	11 Western States 1956	United States 1955	United States 1956	Per Cent West to U. S. 1955	Per Cent West to U. S. 1956
Energy generated (thousands of kwh)	103,399,992	113,811,612	547,037,985	601,440,726	18.8	18.9
Energy generated in hydro plants (thousands of kwh)	65,576,854	76,758,021	112,975,069	121,835,280	58.1	63.0
Energy generated in fuel plants (thousands of kwh)	37,823,138	37,053,591	434,062,916	479,695,446	8.7	7.7
Percentage of hydro to total generated	63.3	67.4	20.6	20.3	...	...
Installed generator capacity (kw)	20,838,693	22,249,693	114,472,000	120,250,000	18.2	18.5
Installed hydro generator capacity (kw)	12,551,794	13,141,794	25,004,000	26,019,000	50.2	50.2
Installed fuel generator capacity (kw)	8,286,899	9,107,899	89,468,000	94,231,000	9.2	9.7
Revenue from energy sales (thousands of dollars)	1,132,354	1,225,000	8,020,439	8,720,000	14.1	14.0

Table II—Ten-Year Generation Record for Western Public Utilities (in thousands of kwh)

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956*
Arizona	2,769,495	3,282,118	3,434,189	3,489,309	3,960,041	6,344,000	5,438,401	5,406,513	5,536,967	6,048,203
California	19,441,429	20,286,893	22,112,191	24,835,775	29,375,692	29,251,000	35,062,488	37,749,350	42,517,200	46,291,420
Colorado	1,375,653	1,592,067	1,630,959	1,855,610	2,263,192	2,316,000	2,731,390	3,518,338	3,717,078	3,977,456
Idaho	1,507,474	1,622,107	1,840,226	2,537,648	2,915,242	3,729,000	3,850,099	3,925,012	3,905,984	4,525,815
Montana	2,764,383	2,869,825	2,915,361	3,136,251	3,303,612	3,780,000	3,727,297	4,272,200	4,695,804	5,273,628
Nevada	2,908,189	3,607,239	3,591,363	3,210,425	2,547,243	3,568,000	2,127,373	1,978,626	1,431,125	1,571,471
New Mexico	753,897	845,696	910,885	1,014,453	1,171,878	1,357,000	1,545,681	1,603,446	1,760,587	2,018,903
Oregon	5,456,577	5,433,228	5,291,441	5,544,548	5,975,489	6,661,000	6,891,347	9,046,223	12,668,280	13,831,297
Utah	562,198	600,208	614,598	658,571	824,318	1,113,000	1,571,054	1,731,901	2,370,492	2,516,664
Washington	11,230,994	13,881,239	15,079,298	17,370,986	19,914,385	19,463,000	22,933,252	23,019,777	23,907,776	26,420,911
Wyoming	325,684	388,656	506,207	594,812	638,386	865,000	835,737	606,133	725,167	953,046

Table III—Type and Capacity of Generators, November 1956

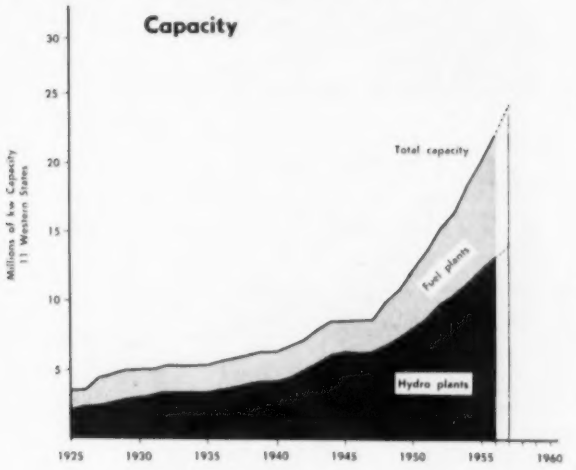
	Number of Utilities	Number of Plants	Total Capacity Kilowatts	Generator Capacity in Kilowatts of Plants Operated by — Water Power Number	Water Power Capacity	Steam Power Number	Steam Power Capacity	Internal Combustion Engines Number	Internal Combustion Engines Capacity
Arizona	13	41	1,632,745	12	980,040	11	586,950	18	65,755
California	19	164	9,352,153	129	3,158,007	29	6,150,136	6	44,010
Colorado	36	76	947,448	28	247,517	22	622,318	26	37,613
Idaho	12	47	781,695	42	777,380	0	0	5	4,315
Montana	8	25	925,152	18	850,910	4	71,800	3	2,422
Nevada	8	18	641,888	10	586,980	1	44,000	7	10,908
New Mexico	15	32	453,290	4	24,910	11	388,400	17	39,980
Oregon	14	72	2,256,306	54	2,052,019	12	198,710	6	5,577
Utah	25	82	513,549	57	93,255	8	388,409	17	31,885
Washington	20	53	4,205,950	39	3,980,454	8	221,500	6	3,996
Wyoming	18	50	236,108	19	143,382	12	79,320	19	13,406
11 Western States	188	660	21,946,284	412	12,894,854	118	8,791,543	130	259,867
United States	1,395	3,564	119,378,128	1,373	25,467,765	1,042	91,508,165	1,149	2,402,198

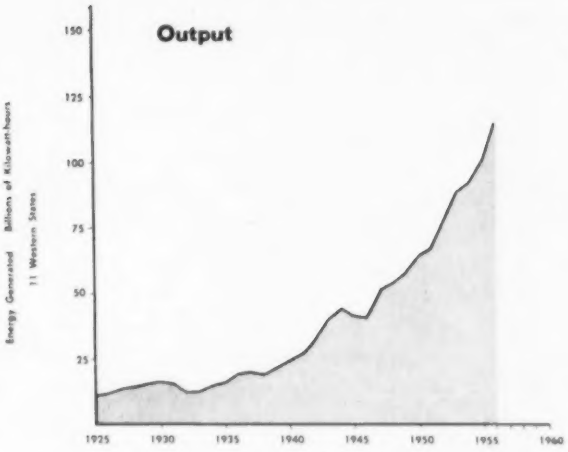
Table IV—Power Company, Federal, Municipal and Power District Systems Construction Expenditures—11 Western States Compared with U. S.

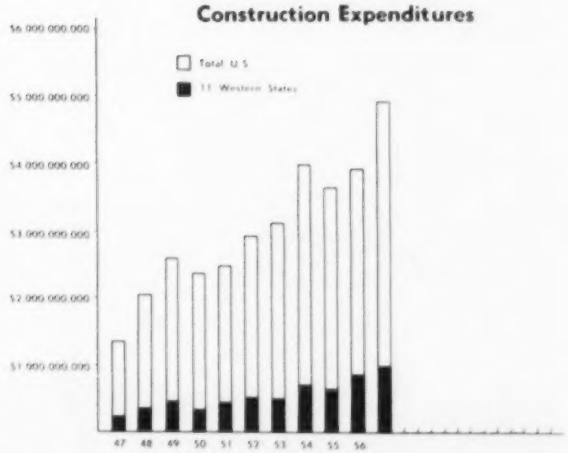
Year	U. S.	11 Western States	Per Cent West to U. S.	Year	U. S.	11 Western States	Per Cent West to U. S.
1948	2,078,088,000	375,000,000	18.0	1953	3,187,489,000	490,664,000	15.4
1949	2,517,614,000	422,000,000	16.8	1954	3,997,669,000	713,133,240	17.8
1950	2,347,171,000	362,519,000	15.4	1955	3,621,513,000	646,736,000	17.9
1951	2,443,324,000	425,195,556	17.4	1956	3,906,000,000	816,000,000	21.5
1952	2,901,250,000	491,315,000	16.9	1957	3,831,457,000	1,016,000,000	21.0

* Compiled by **ELECTRICAL WEST** from FPC, EEI and **Electrical World** statistics based on figures through September 1956. Total budget, all agencies, based on reports representing 94.5% of total meters served in the 11 Western States.

At a Glance







✓ **Planned capacity additions each year through '61 are larger—some over twice as large as 1956. Additions for this period 12,725,000 kw—a million more than was projected last year. 3,500,000 kw to come in '58 alone.**

✓ **West's generating capabilities now exceed 22 million kw—up 6.5% over last year—. Present ratio of hydro to total is 59%—and this will hold for next five years.**

✓ **Energy production up 10% to 113 billion kwh —18.9% of U.S. total.**

✓ **Customers increasing at the rate of 28,000 a month—unofficial total customers in 11 Western states is 8,228,000—a gain of 4.29% over last year.**

✓ **Planned 1957 construction expenditures by Western utilities up 25%—over a billion dollars. Total U.S. increase also up 25%.**

✓ **What it means—The utility industry is feeling the predicted '57-'60 upswing. Spending at this all-time high volume calls for long range planning—not long range guessing.**

✓ **Through this period of unprecedented growth watch the three M's—manpower, money and material—all are necessary, all in short supply. Watch new products, new shortcuts, standardization in new areas. . . . Evaluation and planning today make you right tomorrow—when the stakes are higher.**

✓ **Dealers sold $123 worth of appliances to the average household in 1956. This average household had an investment of nearly $1,028 in appliances TV and radio—in terms of replacement value.**

✓ **33 Western utilities report average power consumption of more than 6,000 kwh—14 over the 9,000 mark and 5 over 10,000.**

Calendar of New Generation

1957—Fuel Generation Planned

(On black)

Map No.	Agency	Plant	Size—Kw
1	Calif. Elec. Power	San Bernardino No. 1	60,000
2	Colo. Springs PU Dept.	Birdsall	22,000
	Hawaiian Electric	Richards Street	50,000
3	Pasadena L&P Dept.	Broadway No. 2	40,000
3	PG and E	Vallecitas*	5,000
5	PS of Colorado	Cherokee	100,000
6	PS of Colorado	Cameo	22,000
7	PS of N. M.	Person	35,000
8	Salt River Power Dist.	Agua Fria	100,000
9	So. Calif. Edison	Alamitos No. 3	175,000
10	So. Calif. Edison	Redondo No. 6	175,000
11	So. Calif. Edison	Santa Susanna*	7,500
12	So. Nevada Power	Clark	60,000
13	Utah P&L	Carbon No. 2	100,000
		Total	**951,500**

1957—Hydro Generation Planned

(On white)

Map No.	Agency	Plant	Size—Kw
1	Army Eng.	The Dalles (Fishway)	27,000
1	Army Eng.	The Dalles Nos. 1 & 2	156,000
2	Army Eng.	Chief Joseph Units 5, 13, 14, 15, 16	320,000
3	Army Eng.	McNary Nos. 13, 14	140,000
	B. C. Electric	Cheakamus Nos. 1 & 2	140,000
	B. C. Electric	La Joie	22,000
	B. C. Electric	Clowhom Falls	30,000
4	Calif. Oregon Power	Eagle Point	2,800
5	L. A. Dept. of W&P	Lower Gorge	3,200
53	Montana Power	H. H. Cochrane	60,000
6	Puget Sound P&L	Snoqualmie No. 2	20,000
7	USBR, Idaho	Palisades Nos. 1, 2, 3, 4	114,000
8	USBR, Utah	Deer Creek Nos. 1 & 2	4,950
		Total	**1,039,950**
		Total for 1957	**1,991,450**

1958—Fuel Planned

(On black)

Map No.	Agency	Plant	Size—Kw
1	Calif. Elec. Power	San Bernardino No. 2	60,000
14	L. A. Dept. of W&P	Scattergood	156,000
15	PG and E	Hunters Point No. 4	165,000
16	PG and E	Humboldt Bay No. 2	50,000
17	Pacific P&L	Dave Johnston	100,000
8	Salt River Power Dist	Agua Fria	100,000
18	San Diego G&E	Encina No. 3	100,000
19	So. Calif. Edison	Huntington Beach Nos. 1 & 2	400,000
20	Tucson GEL&P	(Unnamed)	75,000
		Total	**1,206,000**

1958—Hydro Planned

(On white)

Map No.	Agency	Plant	Size—Kw
1	Army Eng.	The Dalles Nos. 3, 4, 5, 6	312,000
2	Army Eng.	Chief Joseph Nos. 1, 2, 3, 4	256,000
10	Calif. Oregon Power	Big Bend	80,000
11	Cowlitz County PUD	Swift No. 2	86,000
12	Idaho Power	Brownlee	360,000
13	Idaho Power	Oxbow	151,000
14	PG and E	Poe Nos. 1 & 2	106,000
15	PG and E	Butt Valley	36,000
16	PG and E	Caribou No. 2, Units 1 & 2	109,000
17	PG and E	Balch Nos. 2 & 3	91,500
18	PG and E	Haas Nos. 1 & 2	128,000
19	Pacific P&L	Swift No. 1	204,000
20	Pacific P&L	Merwin No. 3	50,000
21	Portland GE	Pelton	120,000
22	Portland GE	Faraday	28,000
9	Seattle City Light	Gorge	57,000
25	USBR, Utah	Gateway Nos. 1 & 2	4,280
26	USBR, Utah	Wanship	1,425
23	USBR, Washington	Roza No. 1	11,250
24	USBR, Wyoming	Glendo Nos. 1 & 2	24,000
		Total	**2,215,455**
		Total for 1958	**3,421,455**

1959—Fuel Planned

(On black)

Map No.	Agency	Plant	Size—Kw
21	Arizona PS et al	Yuma Axis	75,000
22	B. C. Electric	Vancouver Nos. 1, 2, 3, 4†	100,000
25	Burbank PS Dept.	Burbank	44,000
24	Glendale PS Dept.	Glendale	44,000
	Hawaiian Electric	Waiau No. 5	50,000
14	L. A. Dept. of W&P	Scattergood	156,000
5	PS of Colorado	Cherokee	110,000
23	PS of N. M.	Reeves Station	44,000
26	So. Calif. Edison	Mandalay Nos. 1 & 2	400,000
35	So. Colo. Power	Canon City	22,000
		Total	**1,045,000**

1959—Hydro Planned

(On white)

Map No.	Agency	Plant	Size—Kw
1	Army Eng.	The Dalles Nos. 7, 8, 9, 10	312,000
	B. C. Electric	Bridge River No. 2, Units 1, 2, 3	186,000
32	Pacific NW Power	Mountain Sheep	282,000
27	Puget Sound P&L	Upper Baker Nos. 1 & 2	85,000
29	Tacoma City Light	Mayfield	40,000
31	USBR, Colorado	Big Thompson	4,500
30	USBR, Oregon	Green Springs Nos. 1 & 2	16,000
28	Washington Water Power	Noxon Rapids Nos. 1 & 2	200,000
		Total	**1,125,500**
		Total for 1959	**2,170,500**

1960—Fuel Planned

(On black)

Map No.	Agency	Plant	Size—Kw
28	Arizona PS	Ocotillo	110,000
31	Colo. Springs PU Dept.	South Steam Plant	33,000
30	PG and E	Pittsburg No. 5	325,000
6	PS of Colorado	Cameo	33,000
27	PS of Colorado	Denver area	125,000
29	San Diego G&E	South Bay No. 1 over	100,000
12	So. Nevada Power	Clark	60,000
20	Tucson GEL&P	(Unnamed)	75,000
		Total	**861,000**

1960—Hydro Planned

(On white)

Map No.	Agency	Plant	Size—Kw
1	Army Eng.	The Dalles Nos. 11, 12, 13, 14	312,000
35	Army Eng.	Cougas Nos. 1 & 2	25,000
	B. C. Electric	Bridge River No. 2, Unit 4	62,000
34	So. Calif. Edison	Mammoth Pool	126,000
41	Grant County PUD	Priest Rapids	600,000
42	Pacific NW Power	Pleasant Valley Nos. 1, 2, 3, 4, 5	720,000
36	Puget Sound P&L	Lower Baker	55,000
37	Sacramento MUD	Jaybird No. 1	42,500
29	Tacoma City Light	Mayfield Nos. 2, 3, 4	120,000
38	USBR, Wyoming	Fremont Canyon Nos. 1 & 2	48,000
28	Washington Water Power	Noxon Rapids Nos. 3 & 4	200,000
		Total	**2,310,500**
		Total for 1960	**3,171,500**

1961—Fuel Planned

(On black)

Map No.	Agency	Plant	Size—Kw
28	Arizona PS	Ocotillo	110,000
25	Burbank PS Dept.	Burbank	44,000
	Hawaiian Electric	Waiau No. 6	50,000
32	L. A. Dept. of W&P	Haynes	200,000
30	PG and E	Pittsburg No. 6	325,000
3	Pasadena L&P Dept.	(Unnamed)	60,000
23	PS of N.M.	Reeves Station	44,000
33	Utah P&L	(Unnamed)	150,000
		Total	**983,000**

1961—Hydro Planned

(On white)

Map No.	Agency	Plant	Size—Kw
43	Army Eng.	Hills Creek Nos. 1 & 2	30,000
44	Army Eng.	Ice Harbor Nos. 1, 2, 3	270,000
39	PG and E	Kings River	42,000
40	PG and E	Beldon Nos. 1 & 2	113,000
33	Chelan Co. PUD	Rocky Ridge 1 & 2	203,000
37	Sacramento MUD	Jaybird No. 2	42,500
45	Tacoma City Light	Mossyrock No. 1	75,000
47	USBR, Colorado	Upper Molina	8,400
48	USBR, Colorado	Lower Molina	4,600
46	USBR, Montana	Yellowtail Nos. 1, 2, 3, 4	200,000
		Total	**988,500**
		Total for 1961	**1,971,500**

1962—Fuel Planned

(On black)

Map No.	Agency	Plant	Size—Kw
21	Calif. Elec. Power et al	Yuma Axis	75,000
27	PS of Colorado	Denver area	125,000
34	So. Colo. Power	Pueblo	22,000
		Total	**222,000**

1962—Hydro Planned

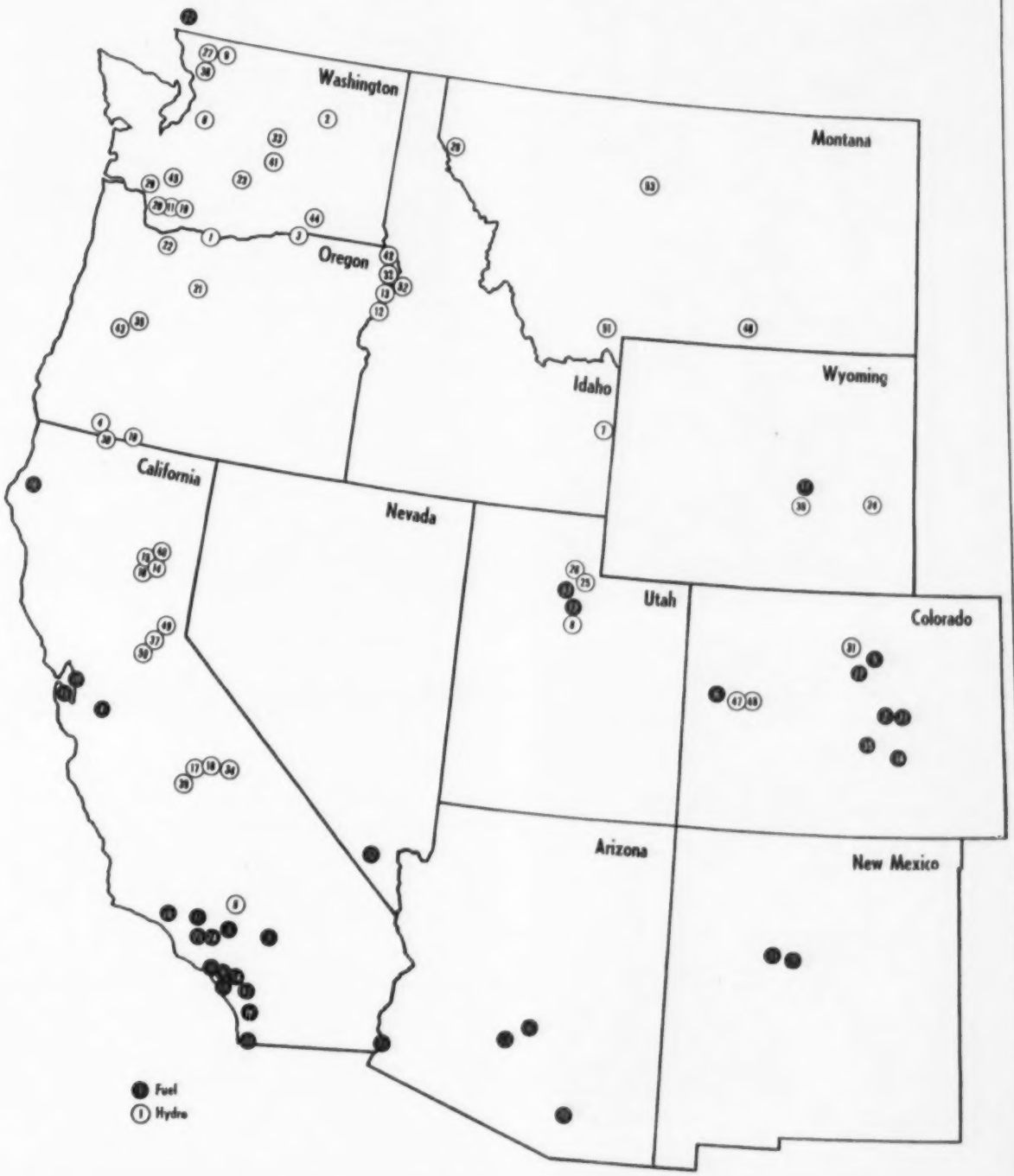
(On white)

Map No.	Agency	Plant	Size—Kw
52	Idaho Power	Hells Canyon	272,000
49	Sacramento MUD	Union Valley	18,000
50	Sacramento MUD	Camino	57,000
44	Tacoma City Light	Mossyrock Nos. 2, 3, 4	225,000
51	USBR, Montana	Lyon Nos. 1, 2, 3	24,000
33	Chelan Co. PUD	Rocky Reach 3, 4, 5, 6, 7	507,500
		Total	**1,103,500**
		Total for 1962	**1,325,500**
		Grand total	**14,051,905**

* Nuclear

† Gas turbine

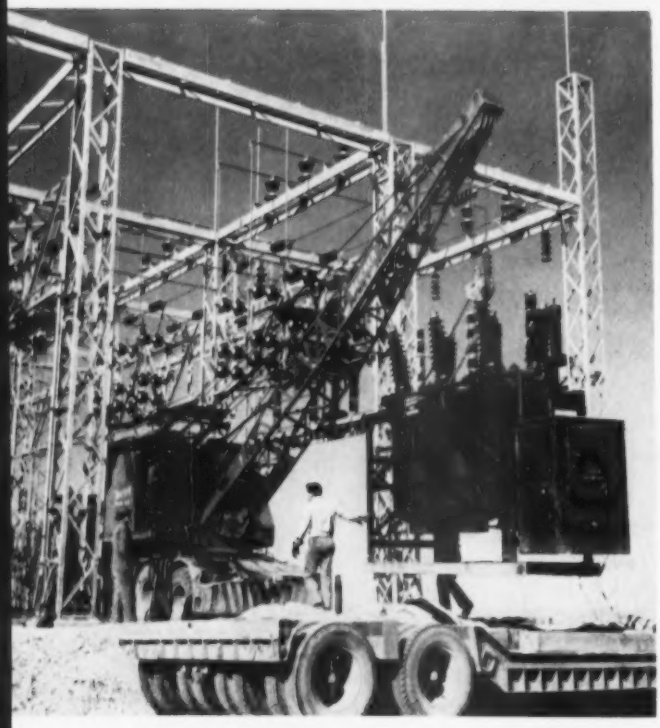
88 New Sources of Power



Geographical distribution of additions being made in the 11 Western states

Typical of the vast expansion of all electric facilities in the West are these scenes showing construction during 1956. Lower left, new breaker being added to Southern Colorado Power system. Upper left, tramway being built to add a penstock at the Balch plant of Pacific Gas and Electric Co. Above, Sierra Pacific Power adds capacity by doubling conductors. Right, dramatic night photograph of Southern California Edison's new El Segundo outdoor steam plant

1955 spending $646 million
1956 spending $816 million, up 25%
1957 spending $1.016 billion, up 25%
1958 may be even bigger



Here's How . . .

Western Utilities

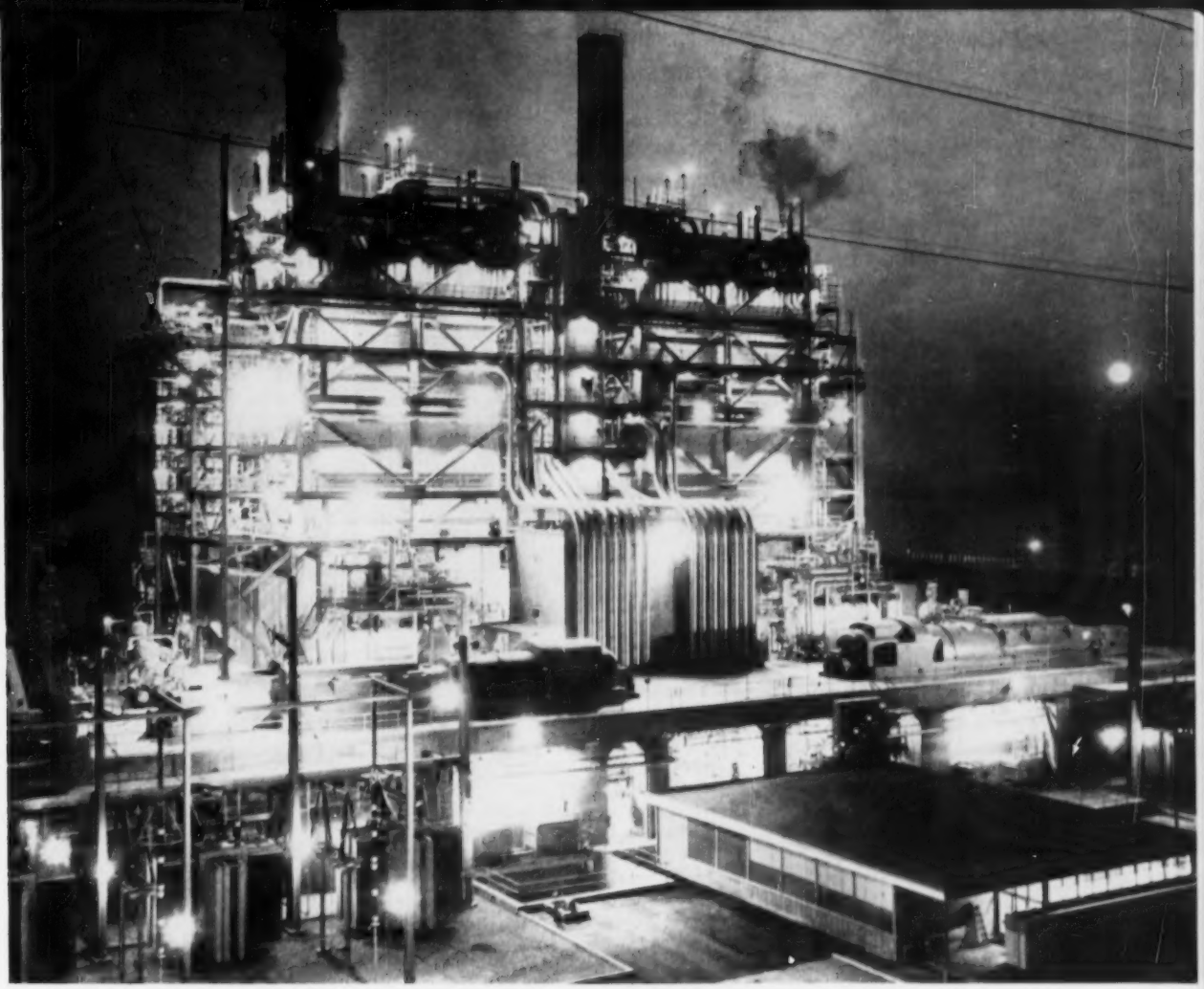
Publication of a billion dollar utility expenditure budget asks more questions than it answers. Probably the first question can be answered quickly. The figures as reported by utilities representing 94.5% of the meters in the 11 Western states have been checked and double checked, and adjusted to include 100% of the meters. The billion dollar budget is real!

Is This a Boom Cycle?

This prodigious growth inevitably asks the question—are we riding the crest of a boom and bust cycle? Indication are that we are not. Generation additions detailed on the previous page can be summarized as follows:

1956—1,411,000 kw	1959—2,170,000 kw
1957—1,991,000 kw	1960—3,171,000 kw
1958—3,421,000 kw	1961—1,971,000 kw

Thirteen million kw in the next five years seem to bode well when we consider that equipment for most plants through '59 is on order and many of hydro sites have work in progress. This rate will double Western



Will Spend $1,016,000,000 in 1957

capacity in eight years, which checks with past performance. Changes in the '60 and '61 figures will probably be upward.

How Will the Money Be Spent?

The figures given above indicate a sizable transmission program because of the preponderance of hydro. The ratio of hydro to total capacity is running 52 to 74% for these years. Transmission line miles linking load centers with generation plants will be up 16% to 2,960 miles. This figure should hold for the next few years. Transmission sub requirements will call for 7,230,000 kva of transformers with the associated structures, breakers, switches and auxiliaries. This represents a 39% increase over last year. Distribution sub capacity shows the same kind of growth, 41%, to 2,700,000 kva for 1957. Distribution line miles are the only index which is off from last year – down to 6,040 from 6,370 miles.

Are We in Step With the U.S.?

Increases in hydro and steam generation, in transmission and distribution sub capacity and in transmission line miles gives us a common sense check on this year's out-sized budget. Another check shows that anticipated spending nationally will be up 25% – the same gain that is indicated for the West. The '57 budget for the West is four times the expenditures during 1947, a decade past.

As a bench mark of the progress that enables the utility business to keep its breakneck pace is the advent this year of two new energy sources. Actually producing power this year will be two atomic stations. Southern California Edison's Santa Susanna station will be first in point of time, to be followed this fall by Pacific Gas and Electric's Vallecitas plant. Both stations are small in capability but represent major achievements in atomic power know how. B. C. Electric has announced a gas turbine station with 100,000 kw capacity. This is the largest gas turbine power station in the Western hemisphere, and will be used to firm the abundant hydro power on the B. C. Electric system.

Who Spends the Billion?

Government spending is down for the second year

giving greater proportion to the volume of private and municipal spending.

More thrilling than the summaries and statistics that point up the pattern of growth in the West are the stories of the expansion plans within the utilities. Here then are the reports on individual expansion programs as reported by utility executives to Electrical West.

Federal

Army Engineers

The many large multipurpose power projects now under construction in the Pacific Northwest by the U. S. Army Engineers will be found listed under the states in which they are located.

Bonneville

Report of the Bonneville Power Administration is on p 114.

REA

Tabulations showing status of REA borrowers are on p 122-123. Construction plans are on p 121.

Bureau of Reclamation

Reports on Western US-BR projects will be found listed under the states in which they are located.

Arizona

Arizona Public Service

Construction expenditures for electrical facilities to be added during 1957 are estimated to cost $13,000,000 as compared with $12,500,000 spent during 1956. There were no major generating units added in 1956. However, engineering was started on the first 110,000-kw steam unit to be installed at the Ocotillo power plant. This unit is scheduled for completion in 1960. Also the joint engineering studies by Arizona Public Service Co. and California Electric Power Co. are well under way on the Yuma Axis power plant. Construction of the first unit to be owned by California Electric Power Co. and operated by Arizona Public Service Co. is to begin in 1957 and to be completed in 1959.

Transmission line mileage to be added during 1957 is estimated at approximately 180 miles compared with 135 miles constructed in 1956. The major transmission extensions completed during 1956 were an 80-mile line from Flagstaff to Tuba City to serve a uranium mill and a 25-mile line into Harquahala Valley to make electric service available to a large new agricultural area. A major portion of the money to be spent on transmission lines in 1957 will be spent in reinforcing the transmission system in the northern part of the state.

Distribution lines to be built will amount to approximately 400 miles in 1957 as compared with 370 miles in 1956. In 1956 a good portion of the extensions were into areas such as Harquahala Valley, where land is being brought under cultivation and requires power for irrigation pumping. There were also many miles of line built to serve the resorts in the fast growing Payson area. Both of the above types of extensions are expected to continue in 1957 as well as the extensions to serve the rapidly growing residential load in the Scottsdale-Paradise Valley area.

The voltage conversions required to serve the growing service areas continued in 1956. The major conversions were the 44- to 69-kv transmission conversion in the Bisbee-Douglas area and the conversion of the distribution lines from 2.4/4.16 kv to 7.2/12.5 kv in the Phoenix, Yuma, Glendale, Prescott and Holbrook areas. Additional 2.4/4.16 kv to 7.2/12.5-kv conversions are anticipated in Yuma, Tempe and Prescott areas in 1957.

One of the industrial loads to be served in 1957 is the proposed Sperry Rand plant northwest of Phoenix in Deer Valley. The estimated load for this plant is 5,000 kw. Air Research is also planning a 1,000-kw expansion at its plant in east Phoenix. During 1956 the company's peak load reached 438.8 mw, which represents approximately 12.2% increase over 1955. Peak load estimate for 1957 is approximately 494 mw.—*T. A. Phillips, vice-president in charge of engineering.*

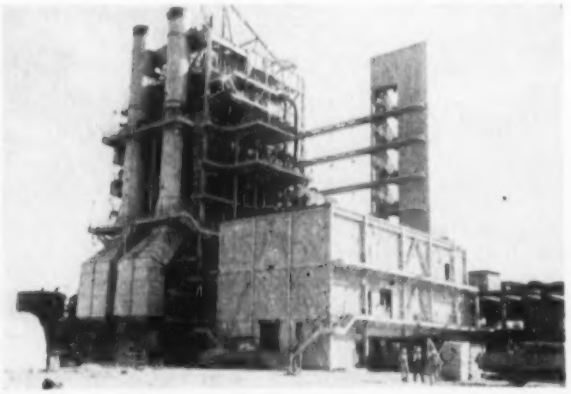
Parker-Davis Project, Arizona-California, USBR

Following award of a contract in December 1956, construction is to begin on the bureau's first microwave radio communication system. The system, which will operate between Parker Dam and Phoenix, Ariz., a distance of 130 miles, will have two terminal stations and two repeater stations and will provide five telephone channels for voice communication from the Bureau of Reclamation's power system dispatcher at Phoenix to Hoover, Davis and Parker power plants, the Gila substation near Yuma, and the dispatcher for the Southern California Edison Co. at Alhambra, Calif. The system will also have 19 telemetering channels for dispatching data on power generation and a service channel.

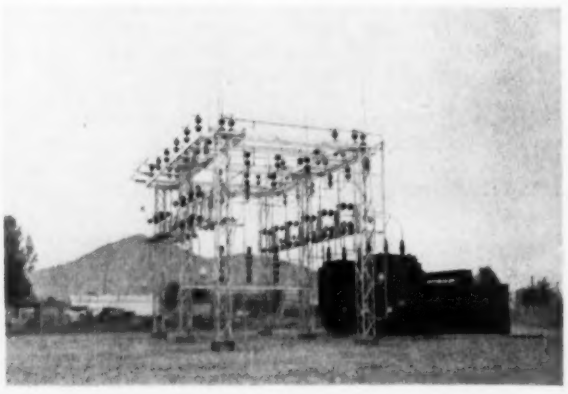
Salt River Power District

Construction expenditures for new and improved plant facilities during 1956 were approximately $17,900,000 as compared with $6,000,000 in 1955. The high level of construction activi-

Salt River Power District's new 100,000-kw station steams



April '57. Right—A new 69/12-kv packaged substation



Pleasing appearance highlights the design of this new distribution substation of Burbank, Calif., PS Department

ties will continue through 1957 with approximately $16,400,000 budgeted. The greater part of the expenditures in 1956 and 1957 are for the Agua Fria steam-electric generating station, where the first 100,000-kw unit is scheduled for operation in April 1957. The second unit is scheduled for completion in April 1958.

The finishing stages of construction have been reached at the new main office building, located in Tempe, Ariz. The two-story, cross-shaped building, with 75,000 sq ft of floor space, will be ready for occupancy early in 1957.

The 1956 system peak was 260,900 kw, exceeding the previous year's peak by some 16%. The 1,450,000,000 kwh generated and purchased in 1956 was 12% greater than the 1955 energy. The number of customers served passed the 50,000 mark.

Four new 69/12-kv substations, with a total transformer capacity of 36,250 kva, were placed in service during 1956. A 69/12-kv, 5,000/6,250-kva capacity mobile substation also was purchased for emergency and temporary use. Transmission lines completed during the year amounted to nine circuit miles. Transmission lines under construction at the end of the year included 19 miles of 115-kv 477-mcm ACSR from Ray to Hayden. Distribution lines added during 1956 amounted to 125 miles.

At Kyrene steam-electric generation station, construction included a sand separation tank for the make-up water supplied from deep wells, a closed-service water system, and a spare exciter for the two units.

Construction for 1957 will include five new 69/12-kv substations, enlargement of two existing 69/12-kv substations, a 115/6.6-kv substation, a 69/4.16-kv substation and a 12/2.4-kv substation. Total transformer capacity involved will be of the order of 80,000 kva. A new dispatching office will be built adjacent to the Cross Cut generating station, with microwave linkage to Agua Fria, Mesa switching station, and the Arizona Public Service Co. microwave system.—*T. M. Morong, chief engineer.*

California

Burbank PS Dept.

A 20,000-kva distributing station, 34.5 kv to 2.5/4.3 kv, was placed in service early this year. A 5,000-kva transformer station was erected to serve the expanding National Broadcasting Co. color television studios at primary voltage.

Plans are under way for the construction of another distribution station and planning is continuing for the construction in the near future of a 44,000-kw steam-electric generating unit, No. 5, on the system.

System peak for the year to date was 75,200 kw and it is expected to reach 76,300 kw by the end of the year, a 5.8% increase over last year.—*A. E. Capon, principal utilities engineer.*

California Electric Power

Construction work undertaken at fuel-electric generating plants in 1956 has included active construction work on the installation of the first 60,000-kw generating unit at the San Bernardino steam plant. This unit, together with certain common facilities, is scheduled for completion in May 1957.

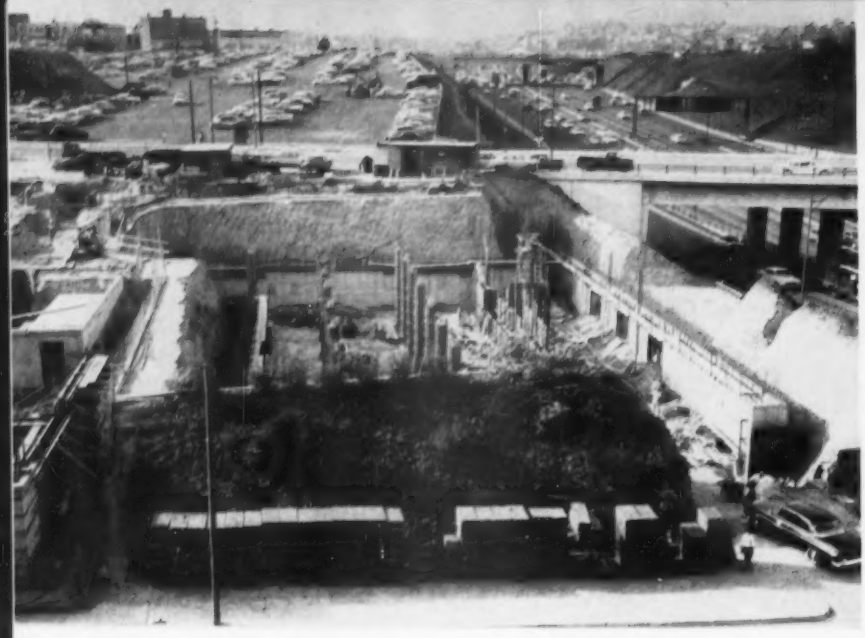
Engineering work is in progress and equipment is on order for the second 60,000-kw generating unit for San Bernardino steam plant. This unit is scheduled for April 1958.

During the year a site was purchased for construction of a fuel-electric generating plant to be located near Daggett, San Bernardino County, Calif.

Work completed, or in progress, at hydroelectric generating plants has included replacement of a short section of wood-stave flow-line; improvements at a multiple-arch storage dam; improvements to a freight tram at an existing plant; installation of water-treating facilities at an existing plant; cable replacement between generators and transformer bank at an existing plant; construction of new garage facilities and improvements to existing operators' cottages; replacement of a station battery and charger at an existing plant.

Transmission expenditures for 1956 have included building of additional transmission lines, including switching, relaying and metering facilities; rearrangement of transmission lines to accommodate connection to the San Bernardino steam plant; improvement of relaying facilities; extension of lightning protection facilities; and purchase of a site for a switching station.

The additional transmission lines



A new underground substation to serve the Los Angeles Civic Center area takes shape. Unusual design features will be described in a later issue

constructed, or under construction, have included a 37-mile section of a 115-kv line to serve a large industrial customer; a 1.5-mile section of 92/161-kv line to supply the transmission system of a Mexican subsidiary company.

Survey and engineering work has also been in progress in connection with rerouting existing transmission lines into the San Bernardino steam plant. Engineering work is also under way on a new transmission line to originate at the plant.

Other transmission expenditures have included the installation of a fixed oscillograph at an existing station; engineering and placement of orders for phase comparison relay facilities between the Highgrove steam plant and the San Bernardino substation; installation of overhead ground wires at selected locations; routine repoling.

Distribution construction, in addition to customer extensions, has included engineering, survey and/or construction of subtransmission lines to provide additional capacity to serve existing loads; substation transformer capacity totaling 7,700-kva in new stations; 50,900-kva net increase in existing stations; installation of new and modernized oil circuit breakers; purchase of additional land for future office, service center and substation expansion; construction of new office and service centers; improvements and additions to existing buildings; cutover of existing primaries to 4-kv or 12-kv operation; reconstruction, reconductoring and repoling on existing lines.

During 1956 the principal single construction expenditure in the category of general structures has been the active construction work on the general office building and general service center buildings in the San Bernardino and Rialto areas. The general office building, a two-floor structure, will be of stone, porcelain enamel and brick construction. The general service center will consist of two single-floor buildings of brick and tilt-up construction. The buildings comprising the office and service center will be located on two tracts of land totaling approximately 40 acres.

The buildings are scheduled for completion during the third quarter of 1957.

During 1957 the largest individual construction expenditures will relate to construction work in connection with fuel-electric generating plants and to general office and service center buildings.

Work at the San Bernardino steam plant will include completion of the installation of the first 60,000-kw generating unit and starting of construction on the installation of the second 60,000-kw unit. General construction work at the San Bernardino steam plant will include construction of 11.5 miles of gas-fuel supply line.

Construction work will start in late 1957 on the first unit of the Yuma Axis steam plant located near Yuma, Ariz.

There will be a large expenditure for completion and equipping of the new general office and general service center buildings located in the San Bernardino and Rialto areas.

Work at hydroelectric generating plants will include improvements at existing dams, intakes, pipe-lines and related works; replacement of 4,600 ft of wood-stave flowline; rewinding of two generators at an existing plant; miscellaneous improvements to electric auxiliaries and construction of and improvements to miscellaneous plant buildings.

The 1957 transmission expenditures are related to the rearrangement and expansion of the transmission system; improvement and modernization of relaying facilities at substations; replacement and modernization of oil circuit breaker and air-break switching facilities; provision for auxiliary a-c and d-c power supply at an existing substation; repoling, reconductoring and reinsulation at selected locations.

The rearrangement of the transmission system will require the construction of approximately 3.5 miles of double-circuit, 115-kv transmission line together with terminal facilities to connect the San Bernardino steam plant to and sectionalize an existing transmission line.

The expansion of the transmission system will include the construction of additional transmission lines in order to adequately serve rapidly developing loads in established areas presently served by long 34.5-kv lines.

In addition to active construction work, considerable engineering and right-of-way work will be carried out in preparation of future expansion of the transmission system.

In addition to expenditures for customer extension, the following major work will be undertaken: (1) Addition of new distribution substations totaling 22,300 kva, increase of 31,200 kva in transformer capacity at existing substations; (2) installation of new and modernized oil circuit breakers; addition of regulators and capacitors at selected station and line locations; (3) construction of new 34.5-kv lines and terminal facilities to provide for increased service to three rapidly developing areas already being served; (4) construction of new operating, stores and commercial office buildings; (5) cutover of existing primaries to 4-kv or 12-kv operation; (6) increased capacity for underground facilities presently serving an existing area; (7) reconductoring, reconstruction and repoling on existing lines. — *W. T. Johnson, vice-president.*

California Pacific Utilities

A great part of our construction budget for the past year was expended for additional distribution system capacity to care for the increased customer use of electric service on our urban and rural distri-

bution systems. Load growth on our Idaho and eastern Oregon properties required the addition of 13,500 kva of new substation capacity in five substations in these portions of our service area. In one of our eastern Oregon communities, the addition of a new lumber mill load caused an increase of 1,000 kva of capacity at the substation serving this rural community. Many of the distribution systems over the company's entire system in the five Western states in which the company operates required the addition of new copper and numerous capacitors to maintain good voltage regulation to supply the greater system demands, which increased 12% during 1956.

We are also pleased to report that our customers continued to expand their use of electricity last year at a very satisfactory rate with an increase of 5.7% in our electric revenues. The company's domestic customers are also proving that they like to Live Better . . . *Electrically*, having increased their average use for the year by more than 300 kwh to 5,700 kwh annually. Rural customers also increased their use of electric service substantially and various rural customers on our eastern Oregon and Nevada service areas added 630 hp of irrigation pumping loads during the 1956 growing season. All indications point to the continuation of the present trend and we estimate that the continued growth in the use of electricity over the various service areas of the company's properties will necessitate the addition of at least 7,500 kva of new substation capacity.

A new industry involving the installation of approximately 1,000 hp at a lime plant at Baker, Ore., will begin operation early in 1957. Preliminary plans also indicate that several new housing subdivisions are projected for a number of Oregon, Nevada and California communities. To serve these subdivisions and the several new rural extensions, together with the prospective addition to distribution systems of numerous growing communities, it is estimated will require the addition of 220 line miles of new distribution.

A number of new high intensity street lighting systems in commercial areas of various communities served by the company were completed during the past year and several substantial additions to comparatively new systems are being planned for 1957. Many of the company's smaller rural communities are also demanding the new modern high intensity lighting and it is expected that many additions will be made to existing systems and that several new systems will be installed. Most of the new systems have been built at the company's expense and these expenditures have been found to be highly desirable as they not only contribute greatly to public safety but also create favorable public opinion.

We are certain that the same healthy growth of the company's electric business will continue as in the past few years as the numerous projects already active or in the planning stage suggest a very satisfactory rate of increase for 1957.—*E. K. Albert, president.*

Glendale PS Dept.

The current 1956-57 fiscal year's budget for capital expenditures is $1,066,400 which is up one-third that of last year. No major expansions of the electric system are scheduled for this year. The normal budget program will continue largely the same as in past years and will consist principally of replacing the older pole lines that have passed their economic life, as well as construction to serve new customers' loads. It is planned to split one overloaded 4-kv feeder into two circuits utilizing equipment already in place.

The third year of an eight-year street light improvement program saw continued progress being made. Ninety-seven luminaires in residential areas were changed from old style radial wave reflectors with bare lamps to 2,500-lumen lamps in refractor-type enclosing globes and 48 of the new type units were added. One hundred and eight 20,000-lumen mercury-vapor units were installed on major thoroughfares and 75 units were installed at major intersections as a part of the State of California's intersection safety lighting program. Before the end of the 1956 calendar year an additional 134 mercury vapor units were installed on one major traffic artery.

Normal system growth accounted for the addition of 3,200 kva of distribution transformer capacity and the connection of 889 new meters. A kwh consumption of 249,695,000 representing a 15.5% increase over the previous year and a peak demand of 57,600 kw representing an increase of 6.1% were due largely to increased usage of old customers.

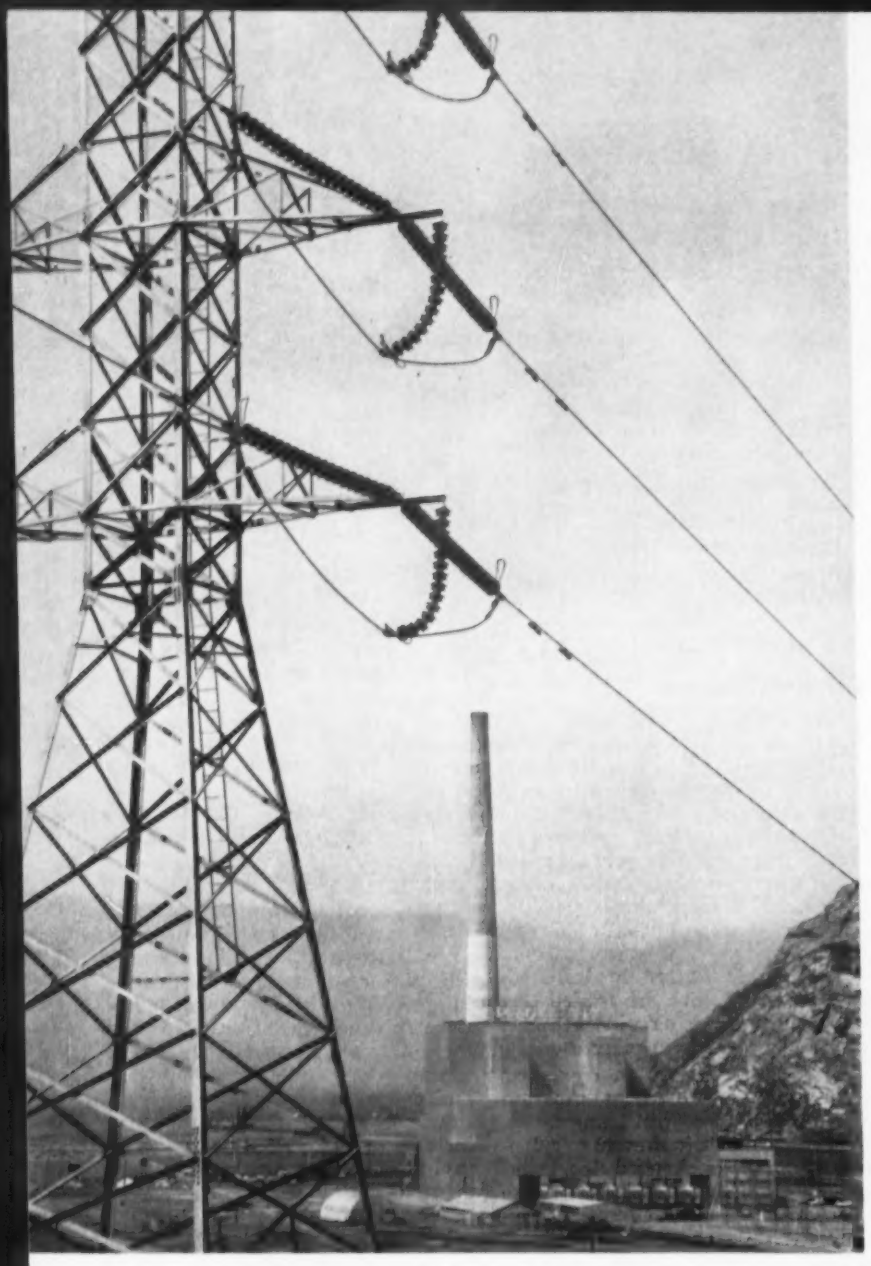
The year 1955 saw the completion of preliminary engineering on No. 4 unit addition to the city's existing steam power plant. Bids have been received and the contract awarded for this 44-mw generating unit and specifications issued for the associated boiler.—*L. W. Grayson, general manager and chief engineer.*

Los Angeles Dept. of W&P

The construction program continues at a high rate in order to provide the necessary plant and facilities to care for the rapid increase in growth of load and customers. Construction expenditures in 1956 for new and improved plant facilities approximated $46,300,000. The budget for 1957 provides for a continued high level of expansion and includes approximately $51,300,000 inclusive of additions and betterments to existing plant.

The fourth unit at Valley steam plant, rated at 156,000 kw, went into

Southern California Edison Co.'s Alamitos station steams unit No. 2 in '57. The station is designed for four units — totaling 700,000 kw of new capacity

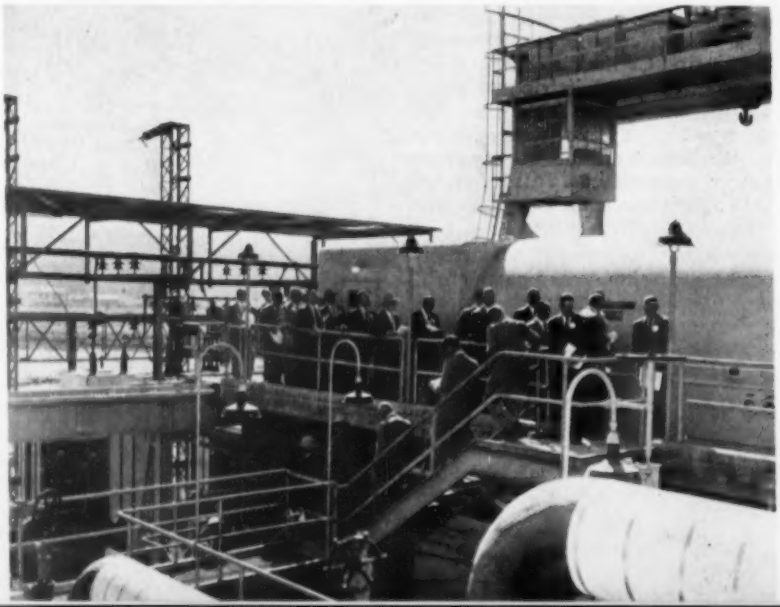


tions, namely receiving station A, located at 1630 N. Main St., is nearing completion. The high-voltage portion of this station has been converted from 115 kv to 138 kv to conform to the voltage used on the department's interconnecting belt lines. In order to utilize the roof of the existing structure to support the new 138-kv equipment, lightweight Brown Boveri air circuit breakers were used. The capacity of the station was increased from 200,000 kva to 300,000 kva. An additional bank of 100,000 kva is held in reserve. Construction of receiving station K, located at 1840 Centinela Ave., has been completed. The third bank, rated at 100,000 kva, was placed in service during the year. This station provides a power supply to the West Los Angeles area. Transformer changes at receiving station H, located at 936 North Poinsettia Place, increased the capacity of the station by 80,000 kva. This station is the main power supply to the Hollywood area.

Three new distributing stations were completed during 1956. These new stations, together with changes in existing stations, have increased the distributing station capacity by 143,000 kva. The following distribution lines were added: 30.8 circuit miles of 34.5-kv overhead and 13.6 miles of 34.5-kv underground; 129.0 miles of 4.8-kv overhead primary; 17.0 miles of 4.8-kv underground primary. The 1956 system peak was 1,268,000 kw on Dec. 5.

The heavy construction program will continue during 1957. Excavation is well under way at the site for Scattergood steam plant, involving the removal of 3,100,000 cu yd of sand and spreading this sand along the ocean front to increase the usable

Pacific Gas and Electric's Morro Bay plant (above) and Humboldt Bay plant (below) mark the extremities of the PG and E seaside steam plants. They are separated by some 600 miles of coastline



service in May 1956. This plant is now complete with a capacity of 512,000 kw. The Pleasant Valley Dam and reregulating reservoir has been completed and is now in operation. This dam permits storage of water below the Owens River Gorge power plants and will make available their full peaking capability. It was found economical to install a unit of 3,200-kw capacity at the base of the dam to utilize the 70-ft drop. This unit should be completed about July 1957.

Rebuilding and modernizing of one of the department's oldest sta-

beach area. This site is located on the ocean front near the Los Angeles-El Segundo city boundary. Actual construction is scheduled to start in February 1957. The ultimate capacity of this plant will be not less than 1,200,000 kw, consisting of six units.

It is planned to start construction of 138-kv transmission lines for Scattergood steam plant during 1957, the lines to be completed in 1958. Lines to be constructed for the initial two units are two circuits from the plant to receiving station D, approximately 12 miles. Portions of these lines may be of overhead construction. To obtain high current-carrying capacity per circuit, it is planned to use twin conductors for each phase in some overhead sections of the lines.

Construction of receiving station L is scheduled to start during 1957 with completion in 1958. This station will be located in the vicinity of the Los Angeles International Airport to take care of the rapidly growing industrial load in that area. Two banks totaling 120,000 kva will be installed initially. Three new stations, together with changes in existing stations, will increase the distributing station capacity by 166,000 kva. New distribution lines to be built (in circuit miles) will include: overhead, 44 miles of 34.5 kv and 131 miles of 4.8 kv; underground, 13 miles of 34.5 kv and 19 miles of 4.8 kv. As presently estimated, the system generation peak for 1957 should approximate 1,370,000 kw.

An extensive construction program is under way to enlarge the department's various underground district headquarters, overhead district headquarters and the general service headquarters. This program includes the heavy mechanical shops at 1630 N. Main St., the Crenshaw-Santa Barbara commercial office, and several warehouses, truck sheds, and miscellaneous structures. — *Ivan L. Bateman, chief electrical engineer and assistant manager.*

Modesto Irrigation District

Capital expenditures for 1956 were approximately $665,000 and are anticipated to be $797,000 in 1957. Approximately 1,100 new services were installed. A new 12,000-v underground vault containing a 500-kva, 12,000 to 120/480-v network transformer was added to the underground system along with additional underground duct work.

One new 69/12-kv substation of 5,000 kva is planned for 1957 and an additional 5,000 kva of 69/12-kv unit is to be added to an existing substation.

About 12 miles of 12- and 4-kv distribution lines were constructed in 1956 and the same rate of construction is anticipated in 1957. Conversion from 4 kv to 12 kv in the fringe areas will continue.

Construction was completed on a new headquarters office building containing 34,000 sq ft. It is anticipated that this new structure will be adequate for the next 20 years.—*C. E. Plummer, chief engineer.*

Pacific Gas and Electric

The 1956 peak load of 4,025,300 kw occurred in June. This is a 6% increase over the 1955 peak, and is more than double the peak of 1947.

Capital expenditures for electrical plant during 1956 totaled $92,300,000 as compared with $99,400,000 for 1955 and $134,000,000 estimated for 1957. Total gas, electrical and other expenditures during the 12-year period from the beginning of 1946 through 1957 will be about $1.8 billion.

The second 165-mw steam-electric unit at Morro Bay power plant was placed in operation during July, bringing the total station capacity to 330 mw. The cost of the Morro Bay plant is estimated at $44,300,000. The first 50-mw steam-electric unit at Humboldt Bay power plant, on Eureka Bay, was placed in commercial operation during December of last year. The cost of this unit will approximate $8,600,000.

The year 1957 will witness the historic event of electrical energy generated on the PG and E system from a pilot nuclear plant. In cooperation with General Electric Co., which is constructing and will own the boiling water reactor and related research facilities, PG and E is constructing steam utilization, electric generating, transforming and transmission facilities to carry the nuclear produced energy to its system. The plant will be located at Vallecitos, near Pleasanton, and will have an initial capacity of 5,000 kw. This will be the first all privately financed nuclear electric generating plant in commercial service anywhere.

It is presently anticipated to place in operation during 1958 a total of 685.5 mw of generating capacity. Hydroelectric plants will account for 470.5 mw of this total. On the Feather River: the two-unit, 106-mw Poe plant; the one-unit, 36-mw Butt Valley plant; and the two-unit, 109-mw Caribou No. 2 plant, which will be located close to the site of the existing No. 1 installation. On the Kings River: the 91.5-mw, two-unit addition to the existing Balch plant and the two-unit, 128-mw Haas plant. This latter installation will be unique in that the waterwheels and generators will be located in an underground chamber 500 feet below ground surface, near Balch Diversion Reservoir, about five miles upstream from Balch power plant. The total cost of these hydro developments, including Wishon and Courtright Dams, will be about $134,000,000 excluding transmission facilities.

The remaining 215 mw of generating capacity planned for operation in 1958 is steam electric. Hunters Point power plant, on San Francisco Bay, will see the addition of 165 mw with the installation of Unit No. 4, at an estimated cost of $21,000,000. This will bring the total station capacity to 427 mw. The cost of the second 50-mw unit at Humboldt Bay power plant is estimated at $6,700,000.

The company anticipates construction of Units Nos. 5 and 6 at Pittsburg power plant, at the confluence of the Sacramento and San Joaquin Rivers. Unit No. 5 is presently scheduled for operation in early 1960, and Unit No. 6 one year later. Each unit will be rated at 325 mw, which will bring the present station capacity of 660 mw up to 1,310 mw.

During the past year 649 mva of transmission and distribution substation transformer capacity were added to the system. This amount includes 267 mva of stepup capacity installed at generating stations. During 1957 it is expected that 609 mva will be installed, of which only 5.4 mva will be stepup.

The company added 100 line miles of transmission (60 kv through 220 kv) and 1,300 line miles of distribution during 1956. This year approximately 245 and 1,300 line miles, respectively, will be constructed.—*Walter Dreyer, vice-president and chief engineer.*

Pasadena L&P Dept.

During the fiscal year 1955-56, energy sold in Pasadena exceeded the previous year by 16.9%. Total revenues increased by 10.9% and operating expense increased by 14.8%. A large part of the increase to operating expense was caused by increased fuel costs. Additions to capital amounted to $6,741,489.89. Construction work in process account as of June 30, 1956, amounted to $4,233,394.72. Distribution transformers in service increased from 113,276 kva to 120,950 kva or 7.7%. Number of meters increased from 47,150 to 47,636 or 1%.

Satisfactory progress was made during the year on the installation

of the second 40-mw generating unit at Broadway steam plant. This unit should be ready for operation in the spring of 1957. The first four-circuit unit of Chester substation was placed in operation. A new four-circuit unit was added to the Hastings substation, approximately doubling its capacity. The areas served by these stations were also converted from 2,400-v to 4,160-v operation.

During the coming year the Wilson substation capacity will be doubled. New four-circuit units will be installed at the Chester and Hastings substations. Two new 34,000-v transmission lines along with related switching station will be installed to feed the east section of town.—*T. M. Goodrich, general manager and chief engineer.*

Riverside PU Dept.

During 1956 the Riverside Light Department spent approximately $600,000 in capital improvements to meet the growing demands placed on the system. Improvements consisted mainly of line rebuilds and extensions. Additional relocation of lines was accomplished to clear the North-South freeway.

The peak load increased nearly 10% from 32,097 in December of 1955, to 35,200 in December 1956. Kwh sales increased 10% from 137,600,000 to 151,316,000, while the number of meters increased by 1,950 to 26,638. Twenty wind machines totaling 2,000 kva were connected to the system.

The $800,000 to be expended for capital improvements during 1957 includes two new substations totaling 9,200 kva, installation of a fourth 33,000-v transmission main and numerous line extensions and rebuilds. —*Everett C. Ross, assistant general manager.*

San Diego G&E

Additions to electric plant in 1956 required expenditure of about $14,500,000. At the Encina power plant in Carlsbad, the completion of unit No. 2 in July 1956 increased the company's total electric generating capability from 469,000 kw to 566,000 kw. Approximately $4,150,000 were spent in 1956 to complete this project. In August construction work began on the addition to this plant that will house generating unit No. 3, the completion of which is scheduled for July 1958. Further expansion of the company's electric production facilities was provided for by the purchase of 145 acres of land fronting on San Diego Bay near the southern boundary of Chula Vista. The new property is to be the site of South Bay power plant. No starting date has been set for construction but on the basis of estimated future load growth, the company anticipates that the first generating unit might be in operation by 1960. Capability of this first unit will probably be in excess of 100,000 kw.

Charm and friendliness welcome customers at San Diego Gas & Electric Co.'s new district office at Escondido. The Western trend is toward local service facilities

The major transmission project completed in 1956 was the 138-kv addition to Mission substation. Including over $657,000 spent on the Mission project, the total expenditure for transmission facilities was about $2,136,000. Extensions for new customers are still second only to production plant in proportion of total funds allocated. Such extensions required expenditures approximating $3,000,000 in 1956. This outlay was about the same as in 1955. A 22-mile 12-kv line from the foot of Banner Grade to Agua Caliente Hot Springs and Canebrake Canyon was completed in December 1956 at a cost of $140,000. Costs of line transformers and customer meters amounted to $1,200,000 and $1,737,000 were spent on the continuous program of distribution line and substation improvements.

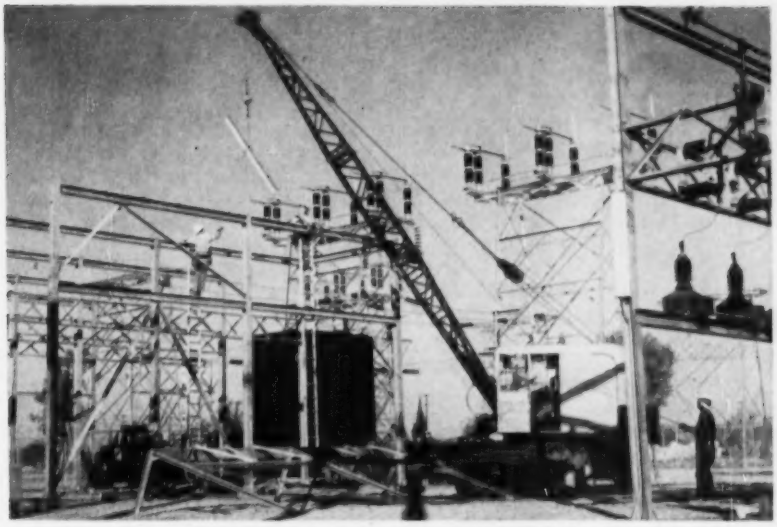
General projects, which are common to the electric, gas and steam departments of the company, amounted to $885,000 in 1956. Of this amount $577,000 are considered applicable to electric plant. Such projects included a new district office in Escondido and modernization of the passenger elevators in the main office in San Diego.

A system peak load of 448,000 kw is expected in December of 1956. This represents a 7.4% increase over the 1955 peak of 417,000 kw. Peak load in 1957 should approximate 482,000 kw. About 12,800 new electric customers were added in 1956 thereby bringing the total served to approximately 262,900. The rate of customer growth is expected to increase in 1957. Over 177,000 kva of transformer capacity were added in our transmission and distribution substations with a further increase of 76,000 kva planned for 1957. Another indication of the continued development and expansion required to keep pace with service demands in the San Diego area is pole line mileage increase. Construction of 182 miles of line was accomplished in 1956 and present plans call for building 265 miles of line this year.

Preliminary estimates of 1957 expenditures amount to approximately $18,000,000. Of this sum, $7,900,000 are to be spent on unit No. 3 at the Encina power plant. Budget estimates for transmission facilities total $2,670,000.

A 138-kv line between Old Town and Mission substations will strengthen the San Diego city loop. Construction will be started in 1957 on the 138-kv Old Town-Encina line, which will increase transmission capacity between Encina and the load centering in the San Diego area. A 138-kv line for initial operation at 69 kv will be built between Mission and Los Coches substations, and a 69-kv line between Japatul Valley and Barrett Lake substation will improve service to Tecate, where energy is supplied to Mexico.

In the plans for distribution system additions, $2,800,000 have been



Sacramento MUD's 115/23-kv South City substation grows with the addition of new facilities to 100,000 kva. In 1956 SMUD completed 10 years of operation

designated for new customer extensions, $1,200,000 for line transformer and meter purchases, and $2,000,000 for other improvements. The new office building for the accounting department will require expenditure of $765,000 in 1957 and should be ready for occupancy late in the year. Preliminary studies are in progress for a new gas operating headquarters in San Diego.—*H. A. Noble, vice-president in charge of operations.*

Sacramento MUD

During the year 1956 energy sales amounted to 931,000,000 kwh and a system peak demand of 220,000 kw was recorded. At the close of the year 129,700 customers were being served.

This past year end marked the completion of 10 full years of operation for the SMUD electric distribution system. During this 10 years the number of customers served has increased 99%, system peak demand has increased 146%, and annual energy sales 308%. This phenomenal growth pattern has necessitated a continuing program of accelerated system expansion.

Plant expenditures for 1956 totaled $7,150,000. This amount included three miles of double-circuit 115-kv steel-tower line, 21 miles of single-circuit 115-kv line built on 230-kv double-circuit steel towers between Folsom Dam switchyard and Hedge substation and approximately 33 miles of 23-kv and 69-kv subtransmission lines. Also included were 50,000 kva of 115/23-kv substation capacity and 17,500 kva of distribution substation capacity.

The district's program of transferring its bulk power supply source to Elverta substation is now approximately 98% complete. This large receiving station permits the district to purchase its energy requirements at 230 kv direct from the Bureau of Reclamation.

Plans for 1957 call for continued system expansion at about the same rate as the past year, $8,000,000 having been budgeted for plant additions. Some major construction work is being carried over from 1956 due to delays in the delivery of equipment. A 115/12-kv, double-ended, transformer-switchgear combination will be installed at station A to provide an additional 25,000 kva of firm capacity for the 12-kv fed underground secondary network. The district's South City substation is in the process of being expanded to a six-feeder ring bus to supply a firm capacity of 100,000 kva to the 23-kv subtransmission system. Approximately 31 miles of 23-kv and 69-kv subtransmission lines are scheduled for construction, as well as 14 single-circuit unit substations totaling 37,000 kva for supply to the 4-kv and 12-kv distribution systems. A large capacitor installation program is presently in progress. This program to be completed in 1957 calls for a total of 42,000 kvar in switched banks ranging in size from 300-kvar pole-top banks on the 4-kv and 12-kv lines to 5,400-kvar banks on the 23-kv substation buses.

Hearings on water rights applications for power purposes on SMUD's Upper American River hydroelectric project have recently been concluded by the State Water Rights Board. A decision is expected soon. The Federal Power Commission is also reviewing the application for license. It is hoped that construction on the first phases of the project can be started during 1957.—*Charles R. Day, supervising electrical engineer.*

Southern California Edison

Approximately $113,000,000 were expended during the year 1956 for plant additions to generation, substation, transmission line, distribution line and other system betterments. The budgeted amount for the calendar year 1957 is approximately $135,000,000 for like system additions and betterments.

During the past year, 1,184.1 line miles of distribution circuits were placed in service and 114.3 miles of transmission circuits were constructed. One new transmission substation was constructed with a capacity of 75,000 kva, and 22 new distribution substations were placed in service with a capacity of 165,500 kva. Transformer capacity of 223,583 kva was added to existing distribution substations and 105,000 kva were added to existing transmission substations. Approximately 85,000 new meters were connected to the system.

Three new generating units with a net effective operating capacity of 360,000 kw were placed in service during 1956. They are unit No. 2 at the El Segundo steam station, unit No. 1 at the Alamitos steam station, and one small hydro unit at Portal power house.

El Segundo steam station is an outdoor-type plant with centralized control facilities. The station is located in the city of El Segundo, Calif., on a 25-acre ocean-front site adjacent to the El Segundo refinery of the Standard Oil Co. This station is unique in that it uses fuel oil of the highest viscosity so far used for commercial power generation, thereby benefiting from the saving in the cost of liquidizing solvents otherwise necessary. Unit No. 1 was placed in commercial operation May 25, 1955.

Construction work on the second unit was initiated in September 1954 and it was placed in commercial operation Aug. 27, 1956. The two units are similar. Steam for unit No. 2 is produced in a single boiler having a continuous operating capability of 1,254,000 lb of steam per hour for delivery to the turbine throttle at 1,800 psig, 1,000 F initial temperature with 1,000° reheat. The turbine is a tandem-compound, triple-flow

exhaust, 3,600-rpm unit, directly connected to the main generator and to an auxiliary generator. The unit increased the system net effective operating capacity by 175,000 kw.

Total station cost for the two units and accessories, but exclusive of the cost of transmission lines, was approximately $42,512,000.

Alamitos steam station is also an outdoor-type plant with centralized control facilities. It is located on a site of approximately 200 acres of undeveloped land near Alamitos Bay and east of the city of Long Beach, Calif. Physical construction of the first unit was started Feb. 9, 1955, and it was placed in commercial operation Sept. 11, 1956. Boiler and turbine data are similar to those for the El Segundo units except that there is no auxiliary generator, auxiliary power normally being obtained from the main generator through a transformer connected to the generator main leads. The unit has increased the system net effective operating capacity by 175,000 kw.

A second unit similar to unit No. 1 was authorized in April 1955 and is currently under construction, being 93% complete at the present writing. It is scheduled for commercial operation in April 1957.

The layout of the site provides space for the installation of two additional large units when the need arises, and the two cooling water facilities are sized to accommodate four units. Cooling water is obtained from one inland channel and discharged into another.

Cost for the station with its two units and accessories, but excluding the cost of new transmission lines, is currently estimated at $39,435,000.

The 10,000-kw hydroelectric Portal power house, started in 1955, is now in operation for test purposes and is expected to be placed in commercial operation during the early part of 1957. It is located near the outlet of Ward tunnel at Huntington Lake in the Big Creek-San Joaquin River development, Fresno County, California. It is estimated that the plant will produce an average annual energy output of 56,000,000 kwh. Cost of the plant, excluding cost of a 33-kv transmission line connecting the Portal plant with the Big Creek No. 1 plant, was approximately $2,500,000. This plant is unique in its high elevation (6,950 ft) and its outdoor design for operation unattended and by remote control from another plant 11 miles away.

The new transmission substation, previously referred to as having been placed in service during 1956, is Ellis substation. It is located on a plot of approximately 54 acres on the west side of the Santa Ana River some six miles south of Santa Ana. In addition to the 75,000-kva 220/66-kv transformer bank, the station provides a 9-position 220-kv rack with three positions initially equipped and a 25-position 66-kv rack with 10 positions initially equipped. The station will receive the output of Huntington Beach steam station, currently under construction, and will be interconnected with the company's 220-kv system at the existing Barre substation and the new Del Amo substation currently under construction. It will provide a source of supply to a rapidly developing section of Orange County. Cost of the station only was slightly over $1,900,000.

Currently under construction, or planned for the start of construction in 1957, are in excess of 1,100,000 kw of new steam generating capacity, consisting of unit 6 at Redondo steam station No. 2, the second unit at Alamitos steam station to which reference has been made previously, two units at Huntington Beach steam station, and two units at Mandalay steam station.

Redondo unit No. 6, at the Redondo steam station No. 2, was authorized for construction in July 1955. It is a semioutdoor plant with centralized control facilities and the unit is similar to the Alamitos units. Construction is presently 66% complete and the unit is scheduled for commercial operation in July 1957. Estimated cost of the unit, exclusive of transmission lines and certain facilities installed for joint use of units No. 5 and No. 6 at the time Redondo unit No. 5 was built, is approximately $19,700,000. Estimated cost of Redondo steam station No. 2 with both units, but excluding transmission lines, is $46,347,000.

Construction work was started in June 1956 on a new steam station to be known as Huntington Beach steam station. It is located on a coastal site of approximately 60 acres situated within the city of Huntington Beach and westerly of the Santa Ana River. It will be an outdoor-type plant with centralized control facilities. The initial installation will consist of two cross compound, axial flow exhaust, turbogenerators each having a manufacturer's rated capability of 200,000 kw. The design of the plant will make provision for an additional two large units. Steam for each unit will be produced in a single boiler having a rated operating capacity of 1,560,000 lb per hour for delivery to the turbine throttle at 2,400 psig, 1,050 F temperature, with reheat to 1,000°. The station will have the first cross compound machines in the West, and will require some unique foundation treatment.

The turbine-generator for each unit will be comprised of a high-pressure turbine, a reheat turbine, and a low-pressure turbine arranged on two shafts rotating at speeds of 3,600 and 1,800 rpm for the high- and low-pressure elements respectively, with the two generators coupled respectively to the high-speed and low-speed turbine shafts in a cross compound arrangement, and with no separate auxiliary generator. Auxiliary power will normally be obtained from the main generator through a transformer connected to the generator main leads. Unit No. 1 is scheduled for commercial operation in June 1958 and unit No. 2 for December 1958. Cost of the two-unit installation, exclusive of transmission lines but inclusive of cooling water facilities for four units, is presently estimated at $59,300,000.

Construction work is scheduled to start before the middle of 1957 on another new steam station to be known as Mandalay steam station. It will be located on a coastal site of approximately 114 acres situated some four miles west of Oxnard and seven miles southeast from Ventura. It will be an outdoor-type plant with centralized control facilities, and initial installation will consist of two units which will essentially duplicate the Huntington Beach units. Unit No. 1 is scheduled for commercial operation in March 1959, and unit No. 2 in September 1959. Presently estimated cost of the initial installation, exclusive of transmission lines, is $60,000,000.

Also either in various stages of construction or scheduled for start of construction in 1957 are four new transmission substations. They are Del Amo, El Nido, Walnut and Santa Clara.

In addition to the four new transmission substations referred to above, 10 new distribution substations are planned for construction in 1957. These new transmission and distribution substations, together with additional transformer capacity to be added during 1957 to existing transmission and distribution substations, will require approximately 1,675,000 kva of new transformer capacity.

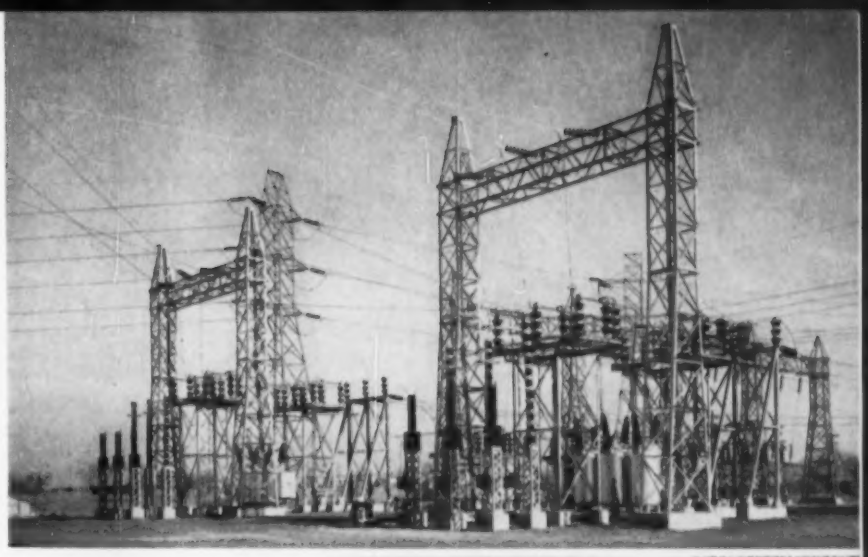
Plans are in progress to construct 1,150 line miles of transmission and distribution circuits in 1957 and to connect approximately 75,000 new meters.—*H. A. Lott, manager, planning department.*

Turlock Irrigation District

Principal construction during 1956 was the completion of nine miles of 115-kv transmission line, a switching station and a 50,000-kva transforming substation. This construction was to provide for future handling of a new hydrogenerating plant line terminal.

Load growth of 7% required 7,500-kva additions to distribution substation transformer capacities.

Construction budget for 1957 is to cover 20 miles of 12-kv distribution lines and 5,000 kva additional transformer capacity.—*L. H. Parker, electrical engineer.*



Colorado

Colorado-Big Thompson Project, USBR

Current plans call for issuance of specifications in March for construction of the Big Thompson power plant near Loveland, Colo. The power house will be of the outdoor type and will have a reinforced concrete substructure. It will have one 4,500-kw generator and a 6,300-hp turbine.

Colorado Central Power

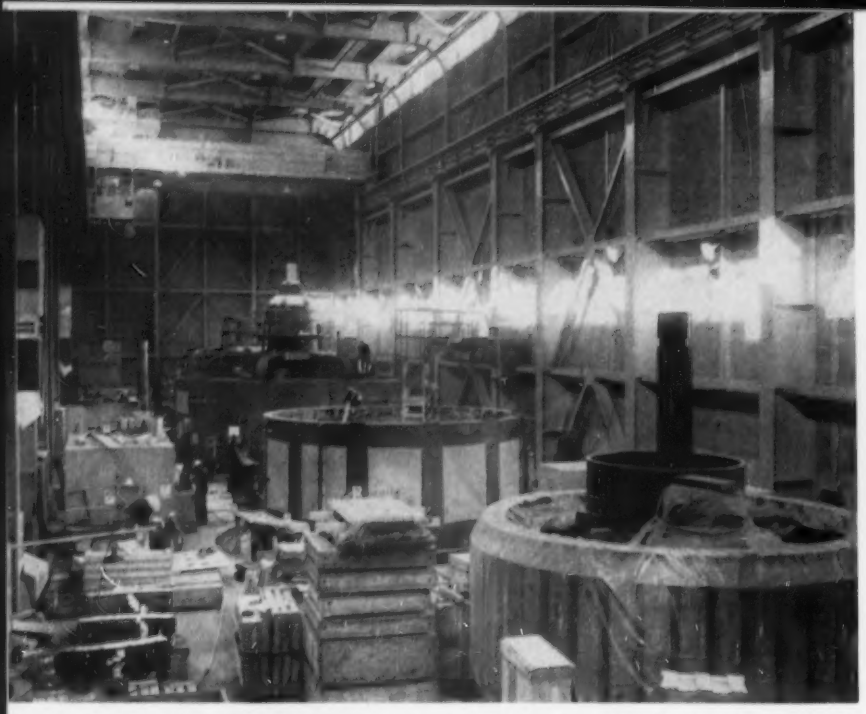
Growth in new customers during 1956 showed an increase of 6.8% over 1955. Kilowatt-hour sales were up 17.5% and system peak demand increased 12.5%. The company spent for construction during 1956 nearly $2,850,000 and the forecast for 1957 indicates we will spend approximately $2,790,000 for construction.

During 1956 a little over $1,000,000 were spent for connecting new customers and routine replacements. $400,000 were spent for major system improvements, and in addition to this amount $1,250,000 were spent to build 26 miles of 115-kv transmission line and build two 10,000-kva substations to serve a new major industry located in the company's Arapahoe district. $200,000 were spent for additions and improvements to company buildings, transportation equipment and other miscellaneous capital improvements.

During the year in the Arapahoe County district, the company began building two heavy 13-kv feeders to serve a second major industry (in addition to the one already mentioned above) which is located southeast of Littleton.

Several other industries already

Rocky Mountain power systems boom as Central Colorado Power, above, adds 115-kv lines to new industrial loads. Right, Western Colorado Power Co. builds a new flume from Trout Lake to Ames station. Below, the Cherokee station will add 100,000 kw to the Public Service of Colorado generating capabilities



The 114,000-kw Palisades project plant will be completed early in 1957. A 115-kv wood pole linking Goshen and Palisades, 60 miles away, was completed in October

served required extra capacity brought about by their growth and expansion. New subdivisions and home building continued to require considerable reinforcement and extension of facilities to keep up with growth.

The growth in our Golden district followed the same pattern as in Arapahoe district, with the company expanding feeders to cover more completely the mountain territory served west and south of Golden. This territory has seen an unusual amount of residential development during the past year.

The company's Evergreen district, which is also located in a mountainous area, saw further development of resorts and residential subdivisions. This growth required reinforcement and extension of facilities.

The growth in the company's Fort Lupton district, which is supported by agriculture, was much slower than the rest of the company's service area.

During 1956 the company put into service a microwave system using both 2,600-mc and 960-mc equipment to improve control of its two-way radio equipment and also to provide voice channels for inter-district communications, telemetering and supervisory control is to be added at a later date.

Early in 1956 the company purchased a sky-master truck unit with pneumatic operated pruners and saws to extend the effectiveness of our tree trimming crews without increasing number of personnel.—*Lee R. Jones, vice-president in charge of operations.*

Colorado River Storage Project, USBR

Specifications for construction of Glen Canyon Dam and power plant are scheduled for issuance in January 1957. The dam and power plant are to be built on the Colorado River in north-central Arizona, about 12 river miles downstream from the Arizona-Utah state line. They are major features of the storage project, which was authorized by Congress in the spring of 1956. The project and 12 participating projects included in the authorization are to be undertaken to develop the land and water resources of the Upper Colorado River Basin, which embraces areas in four states—Arizona, Utah, Colorado and New Mexico.

Glen Canyon power plant, to be constructed near the toe of the 700-ft-high concrete arch dam, will house eight 112,500-kw generating units. The capacity of each turbine is 155,500 hp at a rated head of 450 ft. The power house will be a reinforced concrete structure 665 ft long, 113 ft wide, and 150.5 ft high above foundation. When the 900,000-kw plant is in full operation it will rank as the bureau's third largest, surpassed in hydroelectric generating capacity only by Grand Coulee and Hoover.

Colorado Springs PU Dept.

A 22,000-kv addition to our Birdsall power plant will go into service in January 1957, about two months behind the original schedule. A 115-kv tie line with the Public Service Co. of Colorado, at Denver, will tie the three largest utilities in Colorado together for the first time. This tie will include the Bureau of Reclamation lines and Northwest utility systems will tie practically the whole Rocky Mountain region to the Northwest Pacific network.

Service lines to the U. S. Air Force Academy will be completed early in 1957, the unique feature of which will be their invisibility. Considerable planning and expense were used to hide the overhead 34.5-kv service lines from general view as a compromise between the prohibitive expense of 34.5 kv underground and the unsightliness of overhead lines run promiscuously.

Several substations will be built throughout the city in order to split existing overloaded distribution lines into shorter lengths.—*F. H. Wiley, superintendent, electric division.*

Public Service of Colorado

The Public Service Co. of Colorado construction expenditures during 1956 were approximately 27,978,000, of which $21,682,000 were for electric facilities. The 1957 total construction program is presently set at $33,499,000, with electric facilities requiring $24,875,000.

There was no additional generating capacity placed in service during 1956. The construction of the initial 100,000-kw generating unit at a new site north of Denver has been progressing satisfactorily. This new generating station, to be known as the Cherokee station, is scheduled for commercial operation during the summer of 1957. Also a new 22,000-kw steam-electric unit is under construction at a new site near Grand Junction in western Colorado and is to be known as the Cameo station. This unit is scheduled for operation in the winter of 1957.

During 1956 approximately 66 miles of 115-kv transmission line were placed in service in the San Luis Valley area, and approximately 22 miles of 69-kv lines and 16 miles of 44-kv lines were added to the system. A new 10,000-kva 115/44-kv transformer bank at Sterling, Colo., was added to the transmission substation capacity in October. Additions to the distribution substation capacity to serve load growth totaled 100,000 kva. Included in this total is a 33,333-kva 115/13-kv transformer bank in the Denver area. Approximately 13,000 customers were connected during 1956. The expected maximum peak demand on the company's system of 515,000 will be in December and will exceed the demand in 1955 by 12.8%.

The 1957 transmission construction program includes 217 miles of line and 163,000 kva of substation capacity. Expenditures on distribution facilities in 1957, in addition to extensions, services, etc., will provide 117,000 kva of substation capacity at various locations, including a 115-kv substation in Denver.—*E. F. Nussbaum, treasurer.*

Southern Colorado Power

Our largest single construction job during 1956 was on a 115/69-kv substation and switching structure that we call "West Station" located four miles northwest of Pueblo. This station has been completed and placed in service. It consists of a 115-kv ring bus, utilizing five oil circuit breakers and a 69-kv ring bus also having five oil circuit breakers, the buses being connected by a 20/25 transformer and regulator, with position for another similar transformer. Metering, control and communication are directed to our control center via a five-mile microwave installation.

Several 2,000-kva substations have been built and a considerable amount of distribution conversion from 4.16 to 7.6 kv has been carried on.—*W. C. Porter Jr., vice-president in charge of operation.*

Western Colorado Power

(See Utah Power & Light Co.)

Idaho

Albeni Falls Dam Army Engineers

Albeni Falls Dam, a multiple public benefit project on a major tributary of the Columbia River, was virtually complete at the end of 1955. Its three 14,200-kw power-generating units have been in commercial operation since the summer of 1955. Control of the reservoir by the spillway dam was begun in June 1952. The "pool," consisting mainly of Lake Pend Oreille, one of the West's large natural lakes, contains a normal capacity of 1,153,000 acre-ft of usable storage. This is provided annually for additional power generation at main plants on the Columbia and for river regulation enhancing flood control and navigation. Recreation and conservation are other secondary benefits. Up to Dec. 1, 1956, Albeni Falls Dam produced approximately 350,000,000 kwh of commercial power at the project. It was estimated to be worth about $800,000. Total value in power production at downstream plants from Albeni Falls reservoir storage is estimated to be around $5,000,000.

Major progress was made on the Brownlee hydroelectric development on the Snake River. Before the 364,000-kw Brownlee plant is completed Idaho Power Co. will start on Oxbow. Five new hydro stations are being built along the river in this area

Idaho Power

In an ever continuing program of growth and expansion the Idaho Power Co. spent $21,600,000 in 1956 on new construction, improvements and additions to the general plant. During the year the company built six new distribution substations and three new transmission substations together with a general increase in capacity in many of the existing stations.

The largest transmission substation placed in service was the 160,000-kva 230/138-kv unit at Quartz near Baker, Ore. Normal additions, betterments, and replacements were made in the company's distribution substations, transmission and general plant. Major progress was made in the 364,000-kw Brownlee hydroelectric site. In October the river was completely diverted through the tunnel, and by Oct. 15 the dam area was sufficiently unwatered to permit excavation of the core trench. Permanent and temporary camp facilities were also completed and the entire work continued on schedule. In addition to continuing the work on the Brownlee project, construction will also start on the 151,000-kw Oxbow project in the near future.

The 1957 construction budget for the company will be $47,184,000. The year 1957 will witness the construction and energization of 230-kv substations at Boise and American Falls. 190 miles of existing transmission line between American Falls and Boise that has been operating at 138 kv will be cut to 230-kv operation. A major portion of 90 miles of double-circuit steel tower line from Brownlee hydroelectric site to Boise will be completed. Other major transmission addition will be approximately 44 miles of single-circuit 230-kv wood-pole line from Brownlee to Baker, Ore.

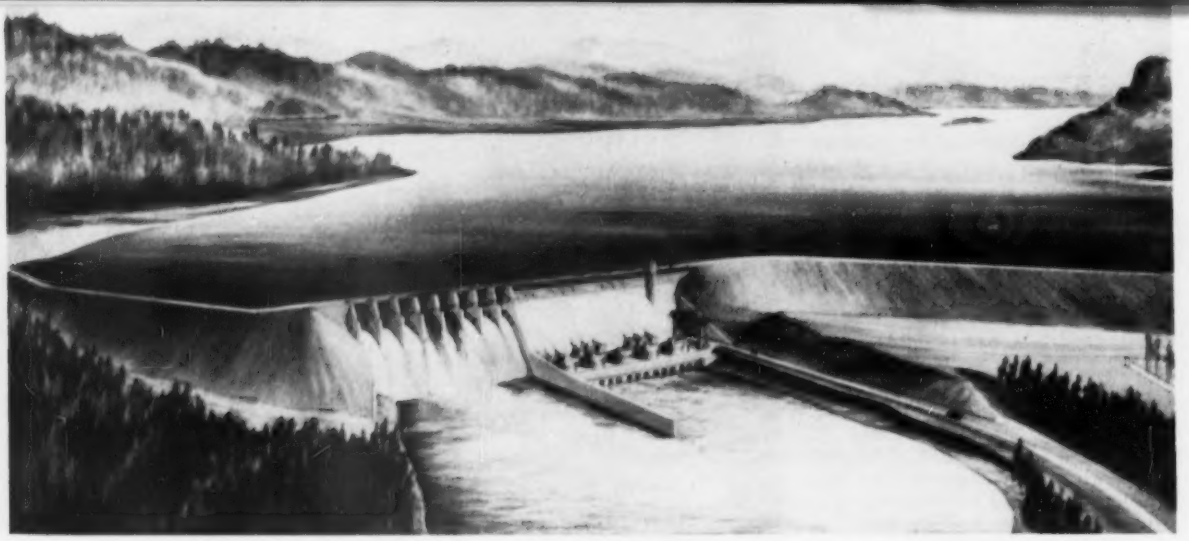
A 40,000-kva synchronous condenser will also be installed at American Falls. Normal additions to distribution substations, transmission and general plant will be made.—*J. F. Emery, superintendent, electrical operations and construction.*

Palisades Project, USBR

Construction of the Palisades power plant structure was essentially completed by the end of the year and installation of unit No. 3 neared completion by year's end. The power plant, comprising four 28,500-kw units, will have a total installed capacity of 114,000 kw. Unit No. 3 is scheduled to go on the line in January 1957, followed by Unit No. 2 in March. Units No. 1 and 4 are scheduled to be placed in operation in June and December 1957, respectively. The 60-mile, 115-kv wood-pole Palisades-Goshen transmission line was completed in October.

Pacific Northwest Power

Federal power commission hearings on Pacific Northwest Power Co.'s proposal to build a major hydroelectric project at Mountain Sheep and Pleasant Valley on the



An artist's view of Washington Water Power Co.'s 87 million dollar 500,000-kw hydro station at Noxon Rapids in Montana

Snake River were concluded Dec. 19 in Washington, D. C.

During 58 days of hearings held during the past six months, all the controversies of the explosive Hells Canyon fight were reopened, and a few new ones introduced.

More than 100 witnesses representing PNP, public power intervenors and the FPC paraded before Hearing Examiner Edward B. Marsh, chief examiner for the commission. They left in their wake nearly 1,000,000 words of heated testimony in 7,315 pages of transcript, plus 245 exhibits containing many more thousands of words and figures designed on one side to support the four-company application for license and, on the other, to tear it down.

PNP was organized in 1954 by Washington Water Power, Pacific Power & Light, Portland General Electric and Montana Power Companies. The generating firm had filed its license application in September 1955 with hopes that work on the 1,183,000-kw, and now $233,000,000, Snake River project would be started in 1956.

Already, over $2,000,000 have been spent by the companies for preliminary engineering and related work.

Fighting the proposal are public power groups headed by the National Hells Canyon Assn. They contend the PNP plan is not adapted to comprehensive development.

PNP has labeled such charges as a "political smokescreen designed only to confuse the issue and delay needed power development in the Northwest."

The four-company group pointed out that Mountain Sheep-Pleasant Valley project not only met the test of best adaptability, but was also the only one that could be producing power by 1960, in time to help relieve critical power shortages.

At the same time, their officials said, the Mountain Sheep-Pleasant Valley plan would result in the lowest possible power costs for regional customers. They added that location of these dams above the mouths of the Salmon and Imnaha Rivers would protect the area's important fisheries resources.

A year's delay has already raised total estimates $20,000,000 above the original cost of $213,000,000, and prevented the company from reaching its original 1959-60 production goal. (Half of the increased costs are in the dams themselves, now estimated at about $156,000,000. The remainder applies to transmission and other costs.)

During local public opinion hearings conducted in Pendleton, Ore., and Lewiston, Idaho, June 25-29, some 70 witnesses who represented all walks of life in the Northwest, urged FPC to make a prompt decision in favor of the PNP project.

In presenting its case, the commission staff found that the Mountain Sheep and Pleasant Valley Dams were engineeringly and economically feasible and, together with future construction of two more dams on the Snake and another on the Salmon, would develop the same reaches of those rivers as would a combination of two other dams which includes the Nez Perce structure proposed by public power forces.

FPC estimated comparable costs and pointed to the superiority of the five-dam plan because of possibility of immediate construction of Mountain Sheep and Pleasant Valley, with completion of the rest of that plan after solution of the fish problem.

Commission witnesses had pointed out that a direct comparison of Mountain Sheep and Pleasant Valley with Nez Perce could not be made because they would develop different river reaches, and for that reason studied their own two plans —one of which included PNP's proposed two dams.

Under one plan, dams would be constructed at the Nez Perce and Asotin sites on the Snake, both below the confluence of the Salmon. The other plan called for dams at Mountain Sheep and Pleasant Valley, one called Lower Canyon on the Salmon, and two more on the Snake —China Gardens and Asotin, both low dams. As noted, the guiding principle was the building of Mountain Sheep and Pleasant Valley first, with the Salmon River Dam being built only after the fish problem was solved. (China Gardens and the Asotin Dams could be built any time actually since they would not affect the fish runs of the Salmon.)

Either plan, FPC said, would develop 730 ft of head on the Snake and lower Salmon Rivers with a total ultimate installed generating capacity of about 2,680,000 kw. Ultimate construction costs of each plan would be about $615,000,000, according to the FPC staff which used federal financing for the study.

Comparing the two plans over a 65-year period, FPC concluded that there would be some slight advantage in the Nez Perce-Asotin plan, but only if the fish problem had been solved in time to have the plants in service by 1970. The plans would be equal if Nez Perce could not be in service until 1975, and the five-dam plan including Mountain Sheep and Pleasant Valley would be superior if Nez Perce could not be placed in service until 1980.

But fish interests in the Northwest are solid in their opposition to the building of Nez Perce, saying the problem is not solved and can't be for a long time. On the other hand, they have approved the building of Mountain Sheep and Pleasant Valley because they feel those dams, located

as they are above the mouths of the Salmon and Imnaha Rivers, would "add only slightly to an already existing problem."

But the big question in the entire matter is whether or not the Department of Interior will intervene with its rumored plan for an even higher dam at Pleasant Valley. An existing study, under way by the Bureau of Reclamation since September, indicates the possibility and/or feasibility of a dam up to 200 ft higher than PNP's proposed 534-ft-high dam.

A higher dam at Pleasant Valley would drown out Idaho Power Co.'s already-licensed site at Hells Canyon, and preclude the high dam wanted at that same site by public power advocates. It would also preclude the building of Nez Perce.

It has not yet been revealed if the Administration will stump for an all-federal dam at Pleasant Valley, recommend a partnership deal or call for an all-private development.

Whatever direction is taken, another real hassle will erupt with both sides unwilling to give up their fight for what they believe to be right.

Meanwhile, FPC examiner Marsh set Feb. 15 as the deadline for the filing of a written argument or main brief by PNP in connection with the case just presented to that body. The commission's examiner also directed that reply briefs be filed by March 15 by the intervenors and the FPC legal staff. PNP will then file a rebuttal brief by April 1.

After the briefs are received, another period of time will be required for the hearing examiner to make his decision, and still more time for the commission to render its final decision.—*Clem Stearns, public relations coordinator.*

Montana

Fort Peck Project, USBR

Completed in August was the Fort Peck-Whately transmission line. It is a wood-pole, H-frame line and has a voltage of 69 kv.

Libby Dam
Army Engineers

The status of Libby Dam and reservoir project remains unchanged, pending completion of a study by the Canadians on water resources. No funds will be appropriated prior to approval by the International Joint Commission.

Missouri River Basin Project, USBR

(See report under Wyoming.)

Montana Power

Start of construction on the H. H. Cochrane hydroelectric development, which will add 60,000 kw to The Montana Power Co.'s generating system, highlighted the utility's program in 1956. Work started on Oct. 6, and the plant is scheduled for completion by December 1957.

The new plant, named in honor of the company's former chief engineer who now is consulting engineer, will be the fourteenth generating plant on the Montana Power system. It is located on the Missouri River near Great Falls, where the company now has four hydro plants.

Completion of the Cochrane development will bring to 671,000 kw the company's system capability. This compares with a 1956 system peak of 530,000 kw.

During the year, the company increased substation capacity in five major load centers, carrying out a continuing program to stay ahead of the steady growth in customers and energy use that the company has experienced during the past 10 years.

The year 1956 also saw initial operation of the company's microwave system which is being built in three stages and which ultimately will give the company 200 telemetering channels and 50 telephone channels, providing rapid communications throughout most of the utility's 90,000 square miles of service area.

The north leg of the microwave system, now in operation, extends north from company headquarters in Butte a distance of 270 miles to Pakowki Lake, Canada, and utilizes 17 stations. Construction of the west leg is scheduled for 1957, with the east leg completing the system in 1958.

Late in the year, Montana Power and Pacific Power & Light completed work that tied the two systems with a 161,000-v transmission line. Montana Power will sell power to Pacific to help serve the latter company's Wyoming loads while construction of a new steam-electric plant near Casper is under way.

Montana Power's major construction in 1957 will be at the Cochrane site. However, several other important projects are planned. Construction will be started on a second 161,000-v transmission line from the company's Kerr hydroelectric development in western Montana to Missoula and Anaconda, and a major substation addition is planned in Butte to meet the growing requirements of the nonferrous mining industry.—*Colin W. Roff, executive assistant to the president.*

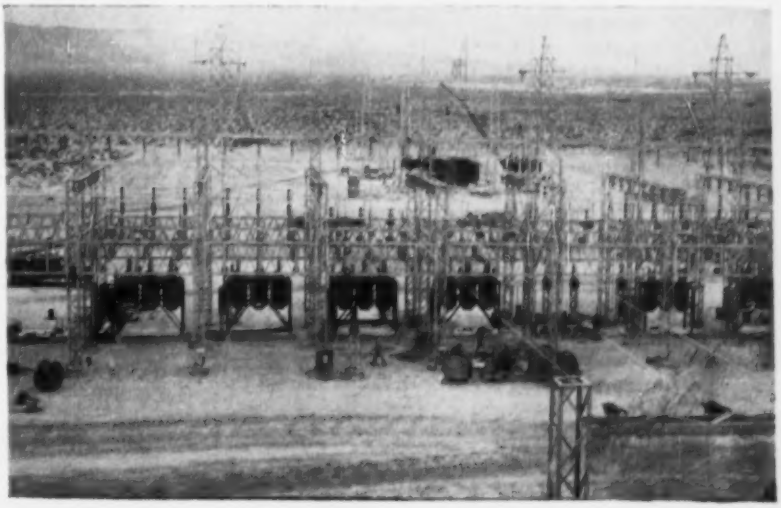
Nevada

Sierra Pacific Power

Consistent load growth on Sierra Pacific's electric system in western Nevada and eastern California sparked a 1956 transmission and distribution construction program of over $3,000,000. Distribution lines, transformers, meters and related items for connection of new customers accounted for about one-third of construction costs.

A second 110-kv transmission interconnection with PG and E was made at Donner Summit. For Sierra Pacific this required the construction of 24 miles of 110-kv line, about 13 miles of 60-kv lines and the installa-

The switching station adjacent to the new Clark steam plant is representative of the growth required of the Southern Nevada Power Co. to keep pace with Las Vegas



Construction is underway for unit 4 at the Person station on the Public Service of New Mexico system. The unit will up the station capability to 111,000 kw

tion of a 45,000-kva, 110-kv/60-kv sub at Valley Road near Reno.

A total of 15,000 kva in distribution substation capacity and about 8,000 kva of switched capacitors were added in 1956.

Continuing a transmission improvement program in the Lovelock, Nev., area the company completed 28 miles of 60-kv line in 1956. This will be followed up with an additional 46 miles in the Humboldt Valley in 1957.

Distribution improvements will continue at about the same rate in 1957 with the proposed installation of about 10,000 kva in substation capacity. Overhead and underground distribution lines and related equipment is expected to total about $1,100,000 for the year.—*M. H. Atcheson, chief engineer.*

Southern Nevada Power

During 1956 work continued on the addition of facilities to insure and improve customer service at a cost of approximately $9,500,000.

Under the heading of generation, work has continued on the installation of the second unit (60 mw) at Clark steam station. The present schedule indicates that this unit will be in operation in May 1957. Letters of intent have been issued for the purchase of a third unit with capacity of not less than 60 mw or larger than 100 mw, which may not be installed until 1959 or even 1960.

During 1956 we completed the construction of 81 miles of transmission line at 69 kv and 138 kv. The largest single job was the completion of 70 miles of 138-kv line operating at 69 kv to serve the Atomic Energy Commission at Mercury, Nev., and the United States Air Force at Indian Springs, Nev.

The substation program during the past year covered the installation of 20 mva of increased capacity in distribution substations. Considerable progress was made on the installation of a more adequate relaying system and of microwave supervisory control of some substations from the dispatching office at Clark station. Two major substations were completely rebuilt and modernized and one new distribution substation with capacity of 9,000 kva was constructed.

On the distribution system, 56 miles of distribution line were added and normal extensions for service to customers were completed. Some of the 4-kv system was converted to 12 kv as a part of a long-range program.

Load growth on the system continues at a fairly high rate. Peak load increased by 17.46% and the increase in kilowatt-hours was 17.75% over the 1955 load. There is still considerable reduction in the energy delivered from the Hoover power plant system, firm power being curtailed by 37½% during most of the year. This is due to low runoff in the Colorado River.

The budget for 1957 will amount to $6,138,000. This is to cover cost of completing the installation of the No. 2 unit at Clark station plus the construction of an estimated 49 miles of transmission line and the addition of 150 mva in 138/69-kv transmission substations. It is estimated that we will build about 50 miles of distribution lines and add 28 mva in distribution substation capacity. — *D. D. Smalley, vice-president.*

New Mexico

Public Service of N.M.

To meet the increasing high demands for electric service in the rapidly growing area served by the Public Service Co. of New Mexico, construction costs will exceed $10,000,000 for the years 1956 and 1957. An extensive street lighting program will require $540,000 of this amount. Additional generating facilities include the fourth unit (net capability 33,500 kw) at Person station, which will be completed in November of 1957, resulting in a total capability for this station of 111,000 kw.

In May of 1959, the first unit of the new Reeves station will be ready for operation. In the spring of 1957, the first 115-kv transmission line will be completed and will circle the city of Albuquerque and interconnect Prager station and Person stations, the U. S. Bureau of Reclamation system and Plains Electric G&T Cooperative. — *M. C. Heffelman, vice-president, operations.*

Oregon

Bonneville Power Administration

Peak energy demand on the federal plants was 4,795,000 kw, 5 to 6 p.m., Dec. 6, 1956. This new all-time high of demand was made possible by the addition of nine generating units during the year totaling 484,000 kw. Units included Chandler Nos. 1 and 2, 12,000 kw; McNary Nos. 11, 12, 13 and 14, 280,000; and Chief Joseph Nos. 6, 7 and 8, 192,000.

U. S. Columbia River federal plants produced 29,000,000,000 kwh for Bonneville Power Administration during 1956 for distribution over the BPA transmission system to 114 customers. Revenue from the sale of this power was $62,900,000 for 1956. Increases over the 1955 calendar year were: peak demand 10%; generation for BPA 22%; revenues 13%.

Expenditures for new and improved facilities during 1956 amounted to about $26,000,000, including $6,500,000 in contract construction. Approval of the present budget before Congress will provide an estimated $26,400,000 in 1957, including $3,400,000 contract carryover, $16,000,000 in new awards, and $6,000,000 in new contract expenditures. The estimate is based on a transmission line program that will keep pace with the schedule of additional generating plant installations.

Transmission system additions during 1956 included completion of 370 circuit miles of high-voltage transmission lines and 2,148,000 kva of added transformer capacity. Plans for 1957 call for construction of about 250 miles of high-voltage transmission line, with added transformer capacity of 2,228,000 kva.

New substations added include the 150,000-kva Keeler; 20,000-kva Long Beach; 33,000 Pelican Horn; 6,000 Ledbeder; 6,000 Burke; and 1,000 Blackrock.

Major transformer additions included: McNary, 683,000 kva; J. D. Ross, 600,000; Olympia, 250,000; Longview, 66,000; Tillamook, 33,000; Highlands, 12,000; Mill Plain, 16,000; Franklin, 12,000; and a number of miscellaneous additions under 10,000 kva.

During the coming year Pacific Northwest contractors will be invited to bid on 300 miles of right-of-way clearing at an estimated cost of $1,100,000; 250 miles of transmission line construction, $1,900,000; and construction of 13 new substations and 34 additions, $2,000,000—or a total of $5,000,000 in contract construction.

Construction will continue to focus on facilities to carry power from The Dalles Dam, now under construction, to the Willamette Valley, southwest Oregon, and other coastal load centers.

Another link in the high-voltage grid for carrying Chief Joseph power will be completion of the 165-mile Chief Joseph-Sultan-Covington 345,000-v transmission line. Transformer additions are scheduled for many BPA substations during the year to meet growing customer loads and provide capacity for new generation. —*Wilbur P. Staats, information officer.*

California Oregon Power

Major items of construction completed during 1956 were:

Completion of the Lemolo No. 2 project of the North Umpqua development. The plant began commercial operation on Nov. 1, 1956.

Completion of the Clearwater switching station, which ties transmission lines from Clearwater Nos. 1 and 2 and Lemolo Nos. 1 and 2 plants to the Copco system.

Completion of 125-kv transmission line 44 from Whiskey Creek in Oregon, west to the vicinity of Crescent City, Calif.

During 1956, preliminary work was continued on the Klamath River development and actual construction was begun on the Big Bend project of this development. Preliminary work was also started on the transmission line from Big Bend to Klamath Falls. Actual construction on this line will start during 1957.—*J. C. Boyle, vice-president and general manager.*

John Day Dam
Army Engineers

Core drilling work on the John Day Dam site on the Columbia River has been completed and the farthest downstream site at Schofield Rapids has been officially selected. While the general rock formation at the downstream site requires some further study to verify the more general preliminary exploration, planning is well under way.

Foundation drilling is 72% complete and the building of a core storage and office building is 95% complete.

Invitations for bids for exploration work for the first step cofferdam at John Day were scheduled for opening late in December and will, undoubtedly, be awarded sometime early in 1957.

Estimated total cost of the project is $350,000,000.

McNary Dam
Army Engineers

Construction work and installation of power generating equipment on McNary project on Columbia River continued on schedule during 1956. Generating units 11, 12, 13, and 14 were placed in service during the year, completing the installation of fourteen 70,000-kw units at McNary. Expenditures of $5,200,000 were spent on the project during the year for a total of $282,000,000 to date. Total final cost of McNary project is currently estimated at $285,000,000.

Portland District
Army Engineers

Bonneville Dam on the Columbia River, 42 miles east of Portland, a power and navigation project, has been producing power since 1938. It is fully installed with 10 generating units for a total of 518,400 kw.

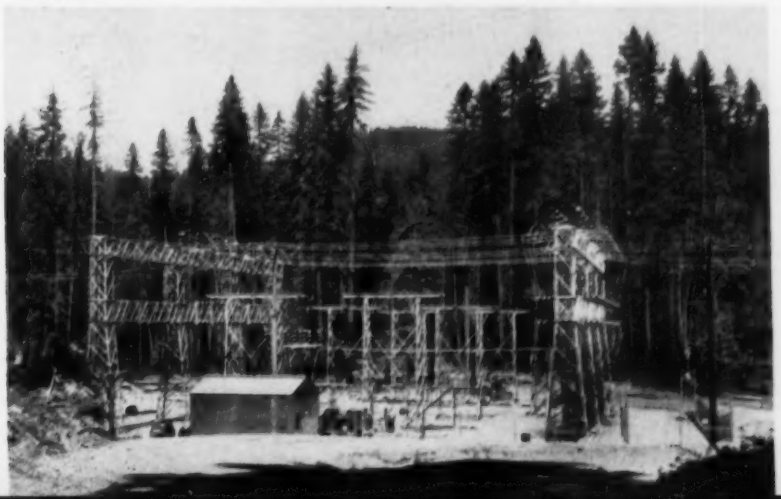
Detroit project on the North Santiam River, 45 miles southeast of Salem, Ore., was completed in 1954. It consists of a flood control reservoir and power house at the Detroit site with two 50,000-kw units, a reregulating dam and power house 2.8 miles downstream at the Big Cliff site with one 18,000-kw unit.

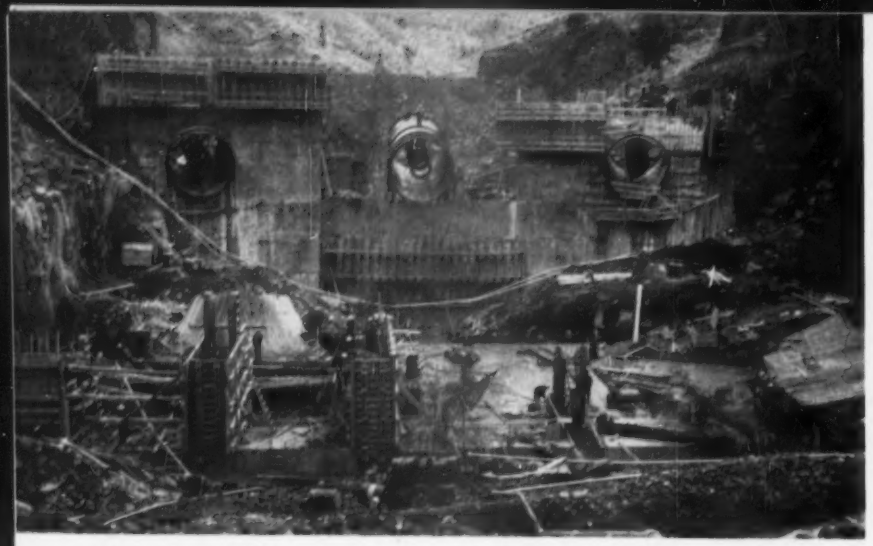
Lookout Point project on the Middle Fork Willamette River, 20 miles southeast of Eugene, Ore., was completed in 1955. It consists of a flood control reservoir and power house at the Lookout Point site with three 40,000-kw units, and a reregulating dam and power house 3 miles downstream at the Dexter site with one 15,000-kw unit.

The Dalles project, located on the Columbia River three miles east of The Dalles, Ore., is being constructed with an initial installation of fourteen 78,000-kw main units, two 13,500-kw fish channel water supply units and two 3,000-kw station service units. Power house substructure to increase the ultimate installation to 22 main units is being provided with the initial construction. The first two main units are scheduled to go on the line in November 1957, and subsequent units are scheduled one every three months thereafter until November 1960 when No. 14 will be completed.

Construction of the spillway dam, power house substructure for units 1 to 22 are complete, and the superstructure for units 1 to 14 is about 87% complete. The project as a whole is about 75% completed. A river closure embankment was filled to effectively shut off the river flow during mid-October, which diverts the entire flow through the eight skeleton units of the power house. The present elevation of the closure embankment is 110 ft; completed elevation will be 185 ft. The reservoir will be raised to elevation 155 ft during March 1957.

COPCO's Clearwater switching station ties transmission lines from the north Umpqua plants of Lemolo 1 and 2 and Clearwater 1 and 2 to the COPCO system





The Pelton hydro project will give 120,000 kw to Portland General Electric

Hills Creek project on Middle Fork Willamette River about 45 miles southeast of Eugene, Ore., or 26.5 miles upstream from Lookout Point Dam, will consist of a flood control reservoir and a power house. The power installation will be two 15,000-kw units. Construction is under way with clearing of the dam site and reservoir area. The diversion tunnel is approximately 60% completed. Contract plans and specifications are being prepared for road relocation and construction of the dam and outlet works.

Cougar project on South Fork McKenzie River, about 44 miles east of Eugene, Ore., will consist of a flood control reservoir and a power house. The initial power installation will be two 12,500-kw units. Construction is under way with clearing of the dam site and reservoir area. The diversion tunnel is approximately 90% completed. Contract plans and specifications are being prepared for road relocation and construction of the dam and outlet works.

Portland General Electric

The construction expenditures in 1957 for new hydrogeneration capacity, transmission and distribution capacity and normal system improvements will amount to $29,500,000. This compares with $17,000,000 spent for new construction in 1956.

Of the 1957 construction expenditures, $19,000,000 will be for the 120,000-kw Pelton hydro project on the Deschutes River and the 78,000-kw combined capacities of the North Fork and Faraday hydro projects on the Clackamas River.

The remaining $10,500,000 construction expenditures in 1957 will be spent for transmission and distribution capacity and normal system improvements.

The 1956 December system peak was 748,000 kw as compared to 701,000 kw for December 1955. The energy for year 1956 increased 10.2% as compared with 6.7% for the system peak. The relatively high temperature which prevailed in December 1956 accounted for the fact that the peak increased at a lower percentage than the annual energy load.

In 1957 the company will increase its interconnection capacity with BPA by completing a 115-kv 795-mcm ACSR transmission line from Bonneville Power Administration's new Keeler substation to station E and installing a second 62,500-kva 115/11-kv stepdown transformer bank at station E.

The company's new distribution substation transformer additions for 1957 total 103,000 kva.

During 1956 the company installed 5,558 new 20,000-lumen mercury lamps on main arterial streets in Portland under the street lighting program which was authorized by the voters in the November 1954 election. The program became effective on July 1, 1955. With the 1,297 new lamps installed in 1955, the total number of new lamps installed under the new city of Portland street lighting program to January 1, 1957, amounts to 6,855.—*John Bankus, chief engineer.*

Pacific Power & Light

A record-breaking 3½ billion kilowatt-hours of electricity were used by customers of Pacific Power & Light Co. during 1956, marking an increase of 9.3% over 1955.

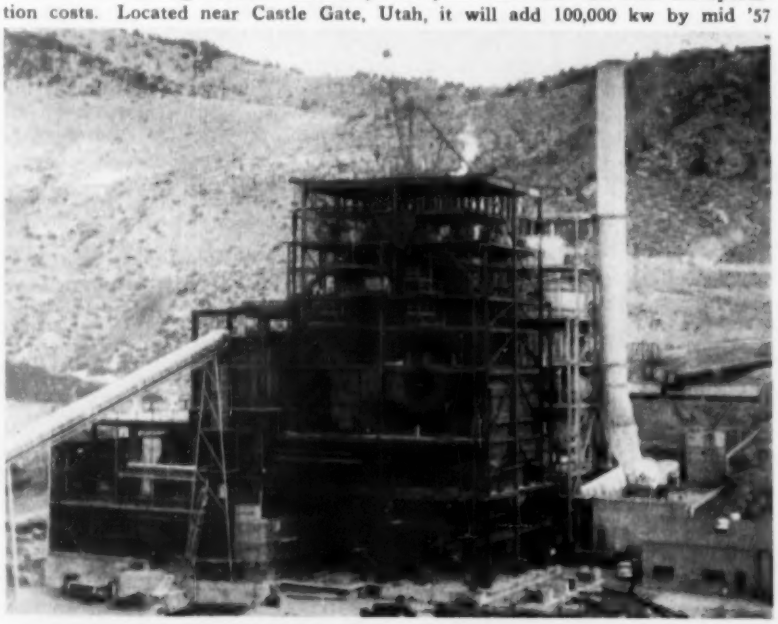
And to keep pace with this all-time high in use of its service, the company set another new record—power plant construction and expansion started during the year will more than double its rated generating capacity by adding 350,000 new kilowatts during 1958.

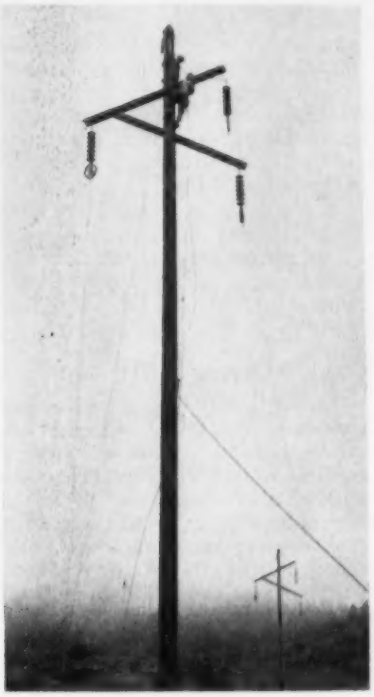
New homes, farms, businesses and industries added to Pacific Power lines during the year totaled nearly 3,700—equivalent to adding a new city of 12,000 to 15,000 population. The year's new customers brought the total served by Pacific to 275,000.

Construction expenditures hit $30,000,000 during 1956, the start of a five-year building program expected to cost in excess of $157,000,000.

Power plant expansion, including the new 204,000-kw Swift No. 1 hydro plant on the Lewis River in southwestern Washington, the 100,000-kw

Utah Power & Light's mine mouth power plant will save on coal transportation costs. Located near Castle Gate, Utah, it will add 100,000 kw by mid '57





Pacific Power & Light linemen building new backbone 115 kv transmission line from Astoria to Tillamook, Oregon

Johnston steam-electric at Glenrock, Wyo., and a third generator at the Merwin plant on the Lewis River required more than $14,000,000. All will go on the line late in '58.

Sixteen million dollars went into expansion and improvement of lines and equipment to bring service to new customers and to provide for the growing needs of present ones.

Total revenues for the system, which serves in Oregon, Washington, Idaho, Montana and Wyoming, reached approximately $48,000,000 during the year.

A heavy program of new building construction was carried on during the year, including expansion and modernization of the Public Service Bldg., expected to cost about $1,500,000 when completed during 1957.

Another $944,000 went into construction of modern service centers at Coos Bay, Corvallis, Albany, Kalispell, Mont., and Sandpoint, Idaho.

Rogue River Basin Project, USBR

Invitations are expected to be issued in April calling for bids on the construction of the 16,000-kw Green Springs power plant and switchyard near Ashland, Ore. The power house will be an outdoor-type reinforced concrete structure having two 8,000-kw generating units.

Utah Provo River Project, USBR

Construction of the two-unit 4,950-kw Deer Creek power plant and switchyard was about 50% completed at year's end. The plant is being built at Deer Creek Dam on the Provo River near Provo. The two 2,475-kw units are planned to be placed in operation in July 1957.

Utah Power & Light

Utah Power & Light Co., serving parts of Utah, Idaho and Wyoming, and its subsidiary, The Western Colorado Power Co., serving western Colorado, spent approximately $17,700,000 in the year 1956 to keep ahead of the rapidly growing power needs of the area.

The major expenditure, which totaled $7,600,000, was for improvements to thermal power stations and for the start of construction on the Carbon No. 2 unit at Castle Gate, Utah.

Expenditures of $500,000 for improvements to hydro facilities included $345,000 for replacing 12,000 ft of wood flume with steel pipe for the Ames-Trout Lake flow line on the Western Colorado Power Co. system.

Transmission additions, including 60 miles of transmission line, 33,000 kva of transformer capacity and general system improvements, cost $4,300,000.

Extension of distribution facilities to new customers and improvement of existing facilities, including 120 miles of distribution line and 28,000 kva of distribution substation transformer capacity, cost $4,900,000. General items totaled $400,000.

Utah Power & Light Co. and its subsidiary for 1957 have budgeted over $21,000,000 for construction expenditures. The largest amount, $7,500,000, is for improvements to existing thermoelectric generating units and for completion of the 100,000-kw No. 2 unit of the mine-mouth Carbon plant located in the heart of the coal fields at Castle Gate, Utah. Construction of this unit, which is scheduled for service in the summer of 1957, will result in considerable savings in freight on coal.

To transmit power from the Carbon No. 2 unit north to the Salt Lake City area, the 115-mile Carbon-Salt Lake City 138-kv line and terminal facilities, started in 1956, are scheduled for completion by the summer of 1957, at a cost of $4,200,000. In addition, the 69,000-v system now terminating at Monticello will be extended 20 miles south to Blanding, Utah, to serve that town, and from that point another 52 miles south to serve a multimillion dollar uranium mill at Mexican Hat, 10 miles north of the Utah-Arizona border. Completion of the above facilities, together with an additional 80 miles of transmission line and 251,000 kva of transformer capacity on the system, will require a total of $6,400,000 during 1957.

Extension of distribution facilities to new customers and improvements of existing facilities in 1957 is estimated at $6,800,000.

Expenditures of $300,000 for general system improvements round out the total figure of $21,000,000.—*E. A. Hunter, administrative assistant.*

Weber Basin Project, USBR

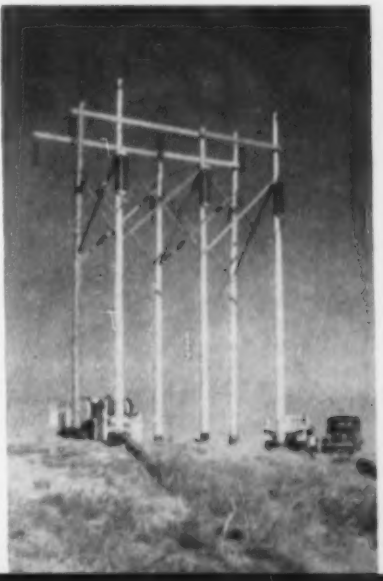
A contract was awarded late in November for construction of the Wanship and Gateway power plants. These are the first power plants to be built by the Bureau of Reclamation having outdoor-type generators. Wanship power plant will have one unit of 1,425-kw capacity; the Gateway plant will have two 2,140-kw units. Both plants are scheduled to be in full operation by the summer of 1958.

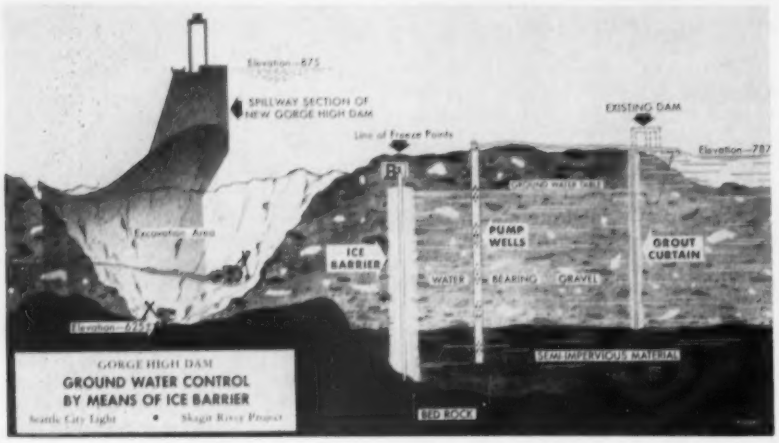
Washington

Chief Joseph Dam Army Engineers

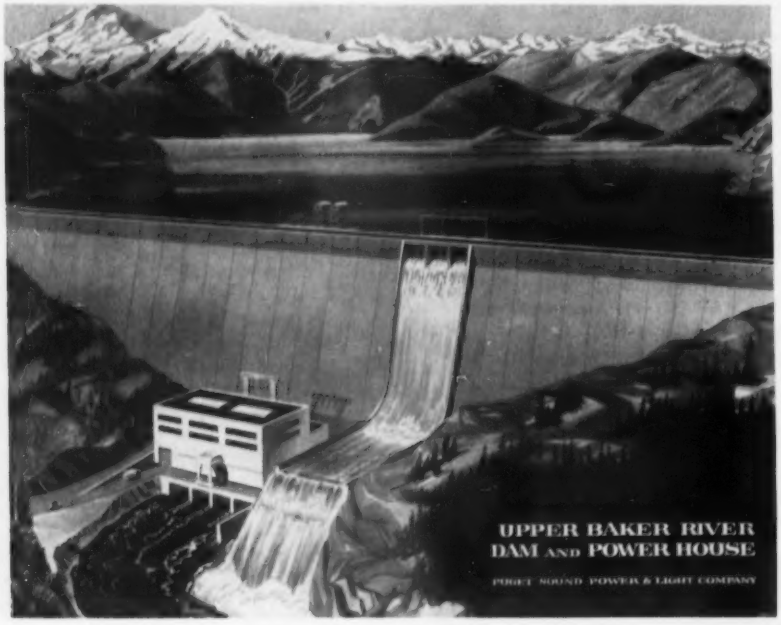
Chief Joseph Dam's seventh power-generating unit was placed on the line officially in commercial production at 12:01 a.m. Thanksgiving Day.

The Carbon terminal of the 138-kv line on the Utah Power & Light Co. system





Two important hydro developments in Washington include: above, Seattle City Light's Gorge high dam shown in schematic form to illustrate the ice barrier that makes excavation at the new site possible. Below, Puget Sound Power & Light Co.'s Upper Baker River project. The total Baker project will add 140,000 kw



Nov. 22, 1956. The first three generators went on the line Aug. 20, 1955. Although each has a rated capacity of 64,000 kw, the first six units have been producing up to 79,000 kw each for many months. The remaining nine of the initial 16 generators at the project are in various stages of installation and all are scheduled to be producing power for the rapidly expanding Pacific Northwest economy by the end of 1958. The full rated capacity of the plant at that time will be 1,024,000 kw. Estimated investment for construction of the project to that date is $150,000,000. Provision was made in planning Chief Joseph Dam to expand the power house for an ultimate installation of 27 power generators and turbines. Addition of the final 11 units will depend upon development of more upstream storage reservoirs. Up to Dec. 1, 1956, Chief Joseph Dam produced approximately 3,253,000,000 kwh of commercial power at the project. It was estimated to be worth $7,500,000.

Clark County PUD

During 1956 the district completed a six-feeder 12.5-kv switching station to serve the rapidly growing section of East Vancouver.

Twelve miles of heavy 12.5-kv feeders were put in operation.

Approximately 1,000 new services together with approximately 12,000 kva in distribution transformer capacity were installed.

In 1957, the district plans to again construct about 12 miles of heavy 12.5 feeder lines to accommodate increasing loads. Pole-mounted regulators will be installed as warranted.

The district will continue a vigorous program of equipment maintenance which has, when combined with the installation of automatic sectionalizing equipment and lightning protection, improved the outage record considerably.—*F. H. Lehman, chief engineer.*

Cowlitz County PUD

During 1956 the district continued with its program of distribution system improvement and extensions. Portions of the cities of Longview and Kelso were converted to higher distribution voltages consistent with the over-all system plan. A new 69-kv line was built from Castle Rock to Gardners Corner, a distance of 3.4 miles. A section 1.7 miles long was rebuilt and relocated north of the West Kelso substation and 3.9 miles were relocated and rebuilt south of Castle Rock. The district continued its street lighting program of new installation and rehabilitation in the cities within its service area. Approximately $36,000 were expended in this connection during 1956.

A new switching station was completed at Castle Rock and a new distribution substation completed at Gardners Corner. Transformer capacity was increased in the following substations: North Woodland, 2,000-5,000 kva; Olive Way, 10,000-20,000 kva; West Kelso, 10,000-20,000 kva; Castle Rock, 3,000-3,750 kva; and Ryderwood 600-1,200 kva.

Costwise total distribution improvements and extensions approximated $940,000, transmission $131,500, production $4,000, equipment and transportation $42,000 and general, including land and structures, $39,000.

On Nov. 29, 1956, the Federal Power Commission granted a license to the district to construct a hydroelectric project on the Lewis River. The project is known as Swift No. 2 and is located on the north fork of the Lewis River, approximately 38 miles east of Woodland, Wash. It will consist of a canal, forebay and power house. The canal, which is 3½ miles long, is connected to the power house of Swift No. 1, now under construction by Pacific Power & Light Co. The power house of Swift No. 2 will have an installed capacity of 67,500 kw. Construction of the project is scheduled to start in the spring

of 1957, with completion by December 1958.

During 1957 the district's construction program will be directed largely towards line reinforcing, line extensions and substation additions. Construction of three miles of 69-kv transmission lines and 6.2 miles of rebuild is anticipated. Also included in construction plans is a new office building to be located in Longview, Wash. Total amount to be spent for over-all system expansion and improvement will approximate $1,000,000.—*O. G. Hittle, manager.*

Ice Harbor Dam Army Engineers

Ice Harbor Lock and Dam is the farthest downstream of four authorized multiple-purpose dams to provide slackwater navigation, hydroelectric power and other beneficial water-use development on the lower Snake River. The dam will be a concrete-gravity-type structure, about 2,790 ft long and 100 ft in effective height. Included will be a single-lift navigation lock, a power house, a gated spillway section and fish passage facilities. Power installation will consist of three 90,000-kw generating units initially and six units ultimately, with a final capacity of 540,000 kw. The current estimated cost of the total project is $135,000,000. Expenditures during 1956 have been approximately $4,000,000.

Actual construction of the project was initiated in January 1956. To date, grading and asphalt surfacing of access roads to the site on both sides of the river, project office road and public parking area have been completed. Contracts have been awarded for the manufacture and delivery of three 143,000-hp turbines and the construction of temporary fish passing facilities. Construction on a project administration building is under way and the first-step cofferdam is scheduled for completion in February 1957.

Puget Sound Power & Light

During the year 1956 construction of the company's 140,000-kw Baker River project was started following the issuance on June 4 of a 50-year license by the Federal Power Commission. The FPC license authorizes a new 85,000-kw hydroelectric project on the Upper Baker River and the installation of an additional 55,000 kw at the present Lower Baker River plant. Construction of a 20,000-kw enlargement of the Snoqualmie Falls hydroelectric plant is on schedule.

Relocation in the company's service areas of functions and personnel formerly based in the Seattle Electric Bldg. has been completed. Two new buildings at Renton house the central division staff and line headquarters. The communications and power dispatching personnel have moved to the new Operations Center at Kirkland. The new four-story building at Bellevue has been occupied by the general offices.

During 1956, 11 miles of transmission line were built. The transmission substations at Bellingham and Bremerton were increased in capacity. Capacity of distribution substations was increased 100,000 kva by the construction of new substations and increase in capacity of existing substations.

In 1957 Puget plans to carry on the construction of the Baker River project and complete the installation of the new 20,000-kw unit at Snoqualmie Falls. In addition, Puget plans to construct about 15 miles of transmission line and add 103,000 kva of transformer capacity to existing substations. Capacity of distribution substations will be increased 100,000 kva by the construction of new substations and increase in capacity of existing substations.

Total plant expenditures for the year 1957 are estimated at about $23,000,000 of which $10,000,000 will be for production plant improvements, $1,800,000 will be for transmission plant, $10,000,000 will be for distribution plant, including expenditures to serve new customers, and $1,700,000 for general plant improvements. — *Frank McLaughlin, president.*

Seattle City Light

During the year 1956 total expenditures for additions to plant amounted to $11,520,000. Improvements and additions to facilities at Ross and Diablo power plants, the installation of the fourth generating unit at Ross and the continued construction of the new Gorge Dam and Gorge - Diablo Highway accounted for a total expenditure of $6,262,000. Other expenditures for the year were $957,000 for transmission plant, $3,761,000 for distribution plant and $540,000 for general plant.

The contract for the fourth 90,000-kw unit at Ross was completed this year in time for winter peak.

Merritt-Chapman and Scott Corp. and The Savin Construction Corp. continue with the construction of the new Gorge Dam and Gorge-Diablo Highway. Excavation for the gravity spillway section and intake structure is proceeding. The freezing of the first-phase ice barrier across the river bed is now substantially complete.

S. Morgan Smith Co. has concluded model tests on new high-head runners to replace the existing Gorge runners when the dam is completed in late 1958. The firm was awarded a contract for three runners.

Extensions to our transmission plant included site preparation for a 150,000-kva bank and installation of two 40-mvar capacitor banks at Bothell substation, 4.6 miles of 115-kv line and 39 miles of 26-kv line.

A total of 27,000 kva of distribution substation capacity was installed during the year, along with a nominal amount of primary and secondary circuits.

Plans for the expansion of hydro plant in 1957 will be the continued construction on the Gorge Dam as scheduled, with the commencement of concrete pouring on the gravity spillway and tunnel intake during spring and summer. The Gorge-Diablo Highway will continue on schedule with completion expected in the summer. Present plans call for the conversion of our Cedar Falls plant to automatic operation and also for the replacement of the remaining wood stave penstock with steel. Other hydro plant expenditures will be for Gorge power house modernization, miscellaneous improvements to general facilities and continued studies on future projects. Estimated expenditures for this construction is $7,228,000.

Extensions to our transmission system will include approximately 30 miles of 115-kv line on wood poles to replace two existing Cedar Falls 55-kv lines and 35 miles of 26-kv circuits. The 150,000-kva bank for Bothell substation, originally scheduled for 1956, will be delivered and installed during 1957. The expenditure for line construction is estimated to be $350,000.

Expenditure for distribution plant will amount to a total of $6,054,000. This amount will be expended for new distribution substations, a transformer bank at Broad Street substation, a 13.8-kv substation to serve the new 120/208 underground network, continued construction on the 13-kv underground supply feeders, converting the South substation banks to forced-oil-air cooling, a new transformer bank at South substation and for new distribution lines and services. Distribution and receiving substation capacity to be added during 1957 is estimated at 204,000 kva.

General plant additions will be a new warehouse, shop and yard facilities to serve the north portion of Seattle, and a seven-floor tower ad-

dition to the existing City Light building. Construction on these two projects will begin during the spring of 1957. Other items are a new pole-yard in South Seattle and miscellaneous items relative to other facilities. Estimated expenditure for general plant is $2,695,000.

The entire program will require a total expenditure of $16,327,000 during 1957.—*H. V. Strandberg, chief engineer.*

Snohomish County PUD

The district completed another year of progress in its operations in Snohomish County and Camano Island. Tremendous strides are being made in the widespread use of electricity paralleling industrial growth and a continuing building program of new homes.

In 1956, $2,225,000 were expended for new and improved facilities. Highlighting the expansion program was the first phase of construction of the Everett substation which, when completed in 1957, will be the largest single addition to the system since the property was acquired Sept. 1, 1949. During the year a 30,000-kva transformer bank, 110/55 kv, was installed. The capacity will be increased to 50,000 kva in 1957 with additional forced cooling. Also completed was a 10,000-kva, three-phase transformer bank, 110/12-kv capacity. This will be increased to 12,500 kva in 1957. Substations were also completed in the growing communities of Darrington, Mountlake Terrace and Lynnwood.

A total electric construction budget of $2,712,000 has been approved for the year 1957 to meet the steadily increasing demands for electric power. Provisions are made in this budget for increasing the capacity in our existing Mountlake Terrace, Monroe, Broadway and Marysville substations. Many of the distribution and transmission lines will be increased to adequately carry anticipated loads.

Also included in the budget is an amount to cover the installation of supervisory control equipment in the service headquarters at Everett. This will be a step toward ultimate supervisory control for all substations in the district.

From all indications it appears 1957 will be another year of progress for Public Utility District No. 1 of Snohomish County.—*A. S. J. Steele, manager.*

Tacoma City Light

Construction work at the Mayfield plant site on the Cowlitz River in Lewis County has been continuous throughout the year. Although major construction at the site has been temporarily curtailed awaiting a decision on litigation pending in the State Supreme Court, it is anticipated that the project will be placed in high gear early in 1957.

Typical of the many smaller hydro projects in the West is the USBR Roza power plant, which takes water from the Yakima Ridge canal

Continued growth in the system load has been evidenced these past eleven months. However, the rate of increase has noticeably dropped from the 10% of last year to 6 2/3%.

Energy purchases, which thus far this year have amounted to 52½% of the system load requirements, will exceed $2,500,000. An abundance of water for self-generation is responsible for the lower purchase ratio resulting this year.

Construction funds budgeted for the calendar year 1957 total $19,774,486, 69% of which is earmarked for hydro power development. Of the remainder, approximately 19% will be used for new distribution facilities, 11% for transmission facilities, and less than 1% for general plant items. There will be approximately 15 miles of 52.5-kv and 16 miles of 4-kv overhead distribution lines erected.—*Everett E. Martin, cost and rate engineering analyst.*

Yakima Project, USBR

The Chandler power and pumping plant was completed early in the year and its two 6,000-kw units were placed in service in February. The plant is interconnected with the Bonneville Power Administration's system of transmission lines in the Pacific Northwest. Construction of the power house structure of the Roza power plant was begun early in 1956 and was about 60% completed by late fall. The contract for furnishing and installing the plant's single 11,250-kw generating unit was begun in April.

Wyoming

Missouri River Basin Project, USBR

The contract for the construction of Glendo Dam and foundation for the Glendo power plant in Wyoming was about 85% completed at the end of the 1956 construction season. The contract for completion of the power plant and switchyard was begun in November. A third contract calling for the furnishing and installing of the plant's two 12,000-kw generating units was awarded early in 1956. Current schedules indicate that the plant will be placed in full operation by the spring of 1958.

Specifications for construction of the Fremont Canyon power plant were issued in November. Like Glendo power plant, Fremont Canyon power plant is a feature of the project's Glendo unit in Wyoming. The plant will have two 24,000-kw generating units, comprising a total installed capacity of 48,000 kw.

Also completed during the year was the 201.5-mile, 115-kv wood-pole line running from Alcova, Wyo., to Gering, Neb., and the 8.1-mile, 115-kv wood-pole Alcova-Fremont line in Wyoming.

Hawaii

Hawaiian Electric

To meet the rapid growth of electrical demand on the Island of Oahu, construction was started on

Hawaiian Electric lays a 44-kv submarine cable across the Ala Wai Canal on Oahu, T. H. Load growth in Honolulu parallels that in the 11 Western States

unit No. 9 in 1956. This second 50,000-kw steam generator in the Richards Street plant is expected to be in operation by the latter part of 1957.

In order to increase the 44/11-kv transmission tie capacity and to minimize the operation of less efficient generators in the Alakea Street plant, the installation of a 20,000/33,300-kva transformer at both School Street and Iwilei substations has been included in the 1957 budget.

In 1955 a test program was initiated to consider the feasibility of employing aluminum conductor and companion clamps in a corrosive atmosphere such as experienced in the Oahu area. Although the test has not been completed as yet, it appears that aluminum will replace copper in most of our overhead work.

During 1956 careful study was given to the elimination of poles on the system. With the cooperation of other joint pole users, considerable progress has been made in this direction. Plans are progressing to spin aluminum secondary cables on a messenger and exclude intermediate poles by making midspan taps for services. Test installations have been effected on Kahala Avenue using aluminum messenger and cable.

The year 1956 saw the completion of a combination warehouse, basevard and office building at Pohakupu. This installation will serve as an operation base for construction crews on the windward side of the island.

A total of 2.1 miles of new 44-kv line was added to the transmission system this year. Of this amount, 1.27 miles were converted from 11 kv in the McCully area.

Approximately 15.5 miles of 1/0 copper 44-kv line were replaced with 336,400 cm all-aluminum conductor on A and B lines from Waiau power plant to Wahiawa substation.

Duct line totaling 1,495 ft and four manholes were built to provide space for the new 44,000-v cables to Waikiki substation to replace the original 11-kv primary feed. In connection with this work, 835 ft of 44-kv submarine cable were laid across the Ala Wai Canal.

Also, 12,450 ft of low-pressure gas-filled 44-kv cable were installed to transmit power from Honolulu unit No. 8 to the Kaimuki, McCully and Kapahulu areas.

Total distribution substation capacity was increased at Kapiolani, Mikilua, Pauoa, Wahiawa and Waimanalo by 17,500 kva, while the distribution transformer capacity was increased by 14,000 kva during the year.

Other construction in 1956 included 49 new and rebuilt transformer vaults, underground distribution systems for seven subdivisions totaling 279 homesites and overhead systems for 52 subdivisions totaling 1,965 homesites. — *L. W. Lengnick, vice-president and executive engineer.*

Rural Electrification Administration

REA approved more than $48,000,000 in rural electrification loans to borrowers in 11 Western states during 1956. This was about $2,000,000 more than the amount loaned to borrowers in this area during the preceding year and brings the cumulative total to nearly $423,000,000.

Last year's loans were distributed among the states as follows:

Arizona, $505,000; California, $9,410,000; Colorado, $14,145,000; Idaho, $2,412,000; Montana, $1,878,000; New Mexico, $7,457,000; Oregon, $5,946,000; Utah, $979,000; Washington, $2,975,300; Wyoming, $2,427,000. No loans were made in Nevada during 1956.

These loans will enable rural electric cooperatives, public power districts and other power distributors which are using REA financing to

Construction Planned by REA Distribution-Type* Borrowers In 11 Western States 1957 Through 1961

	1957	1958	1959	1960	1961
Arizona	1,315,000	1,609,000	1,078,000	1,312,000	1,673,000
California	2,657,000	2,274,000	2,511,000	2,671,000	2,863,000
Colorado	4,216,000	6,720,000	3,353,000	2,685,000	2,322,000
Idaho	572,000	508,000	604,000	546,000	530,000
Montana	1,780,000	1,419,000	1,747,000	1,463,000	786,000
Nevada					
New Mexico	1,807,000	7,918,000	1,634,000	2,289,000	6,502,000
Oregon	1,593,000	1,408,000	1,342,000	1,084,000	957,000
Utah					
Washington	2,916,000	2,855,000	2,213,000	2,993,000	2,190,000
Wyoming					
Alaska	3,533,000	1,495,000	1,545,000	1,701,000	992,000
Total 11 Western States	**20,389,000**	**26,206,000**	**16,028,000**	**16,744,000**	**18,815,000**
Total U.S.A.	**151,975,000**	**138,445,000**	**109,243,000**	**107,514,000**	**107,000,000**

*Power-type borrowers not included.

Per Cent Breakdown of Purchases for Both Distribution- and Power-Type REA Borrowers

	1957	1961
Distribution	46.8	36.5
System improvement	24.1	19.2
Generation	15.6	33.6
Transmission	10.0	7.7
Consumer facilities	3.5	3.0
	100.0	100.0

serve an estimated 30,000 new consumers and add approximately 4,000 miles of new line.

In October 1956, REA rural electric borrowers were serving about 330,000 consumers in the Western states over more than 132,000 miles of line. In December 1955, nine months earlier, about 320,000 consumers were receiving electric service over a little more than 130,000 miles of line.

Power suppliers using REA loans continued during 1956 to pay special attention to system improvements to meet the continually growing demand for more electric power in rural areas. Nationally, power consumption on REA-financed lines is doubling every five years. To help meet power shortages which have developed in some areas, REA is working with its borrowers and other segments of the electric industry in an effort to make generating capacity available to rural distributors of power. Loans were made for additional generation and transmission during the year where the need was clearly demonstrated. These included nearly $10,000,000 in loan funds to the Tri-State Generation and Transmission Assn. in Colorado and almost $4,000,000 to the Plains Electric Generation and Transmission Cooperative in New Mexico.

REA estimated that 94.1% of farms in the 11 Western states had electric service on July 1, 1956. The percentage of electrified farms in the individual states was estimated as follows:

Arizona, 87.4%; California, 96.7%; Colorado, 88.7%; Idaho, 96.9%; Montana, 86.1%; Nevada, 73.5%; New Mexico, 83.5%; Oregon, 97.3%; Utah, 97%; Washington, 98.4%; Wyoming, 84.7%.

Status of Western REA-Financed Systems

Borrower	Cumulative Construction Loans, 12/31/56	1956 Construction Loans	Miles Energized 10/1/56	Consumers Served 10/1/56
ARIZONA	**$21,822,369**	**$ 505,000**	**4,557**	**14,479**
Stonewall Elec. Co., Trinidad, Colo.	100,000†		116‡	200‡
San Carlos Irrig. & Drainage Dist., Coolidge‖	142,286†		117‡	331‡
Navopache Elec. Co-op., Lakeside	3,248,000		717	2,971
Sulphur Springs Valley Elec. Co-op., Willcox	6,792,828		1,497	5,873
Littlefield Elec. Co-op., Littlefield	20,000		14	22
Graham County Elec. Co-op., Pima	3,032,318		622	2,326
Trico Electric Co-op., Tucson	4,695,368	347,000	720	1,015
Verde Electric Co-op., Cottonwood	664,569	106,000	214‡	448‡
Mohave Electric Co-op., Kingman	975,000		285	483
Duncan Valley Elec. Co-op., Duncan	802,000	52,000	255	810
Welton-Mohawk Irrig. & Drainage Dist., Wellton‖	1,350,000			
CALIFORNIA	**$30,433,178**	**$9,410,000**	**3,391**	**42,851**
Imperial Irrig. Dist., Imperial‖	700,000†		800‡	4,100‡
Surprise Valley Electrification Corp., Alturas	2,391,500		978	1,858
Plumas-Sierra Rural Elec. Co-op., Portola	1,687,000	195,000	554	1,218
Mountain Empire Elec. Co-op., Campo	822,000		224	1,105
Mesa Electric Co-op., Phelan	67,829†		*	*
Klamath River Elec. Co-op., Hornbrook‖	43,849†		3‡	80‡
Sacramento MUD, Sacramento	23,239,000	8,883,000	687	34,212
Desert Electric Co-op., Twentynine Palms	932,000	332,000	*	*
Anza Electric Co-op., Anza	550,000		145	278
COLORADO	**$104,071,741**	**$14,145,000**	**31,276**	**73,654**
Grand Valley Rural Power Lines, Grand Junction	2,233,000	504,000	720	3,617
San Luis Valley Rural Elec. Co-op., Monte Vista	4,264,000	515,000	1,305	3,251
Morgan County Rural Elec. Assn., Fort Morgan	5,793,000		2,128	4,613
Intermountain Rural Elec. Assn., Littleton	6,354,500		2,270	7,047
Southeast Colorado Power Assn., LaJunta	8,805,234	830,000	4,992	5,453
Gunnison County Elec. Assn., Crested Butte	997,166	208,000	277	661
Delta-Montrose Rural Power Lines, Delta	1,742,000		772	2,274
Union Rural Elec. Assn., Brighton	2,897,000		1,006	3,829
San Isabel Elec. Assn., Pueblo	4,794,741		1,593	4,911
San Miguel Power Assn., Nucla	2,656,000		523‡	1,756‡
Highline Electric Assn., Holyoke	4,186,511		2,708	4,201
Poudre Valley Rural Elec. Assn., Ft. Collins	3,543,000	1,060,000	1,271	3,742
LaPlata Electric Assn., Durango	1,809,000		711	2,241
Empire Electric Assn., Cortez	3,790,448		810	4,302
Holy Cross Elec. Assn., Glenwood Springs	1,560,000		546	1,673
Sangre DeCristo Elec. Assn., Salida	1,222,000		469	1,227
Yampa Valley Elec., Assn., Steamboat Springs	4,861,000		1,346	4,395
Mountain View Elec. Assn., Limon	5,790,500		2,742	4,297
Y-W Electric Assn., Akron	3,833,747		2,101	3,536
K. A. Electric Assn., Hugo	4,295,000		1,958	3,262
White River Elec. Assn., Meeker	1,780,894	290,000	352	997
Mountain Parks Electric, Granby	3,240,000	770,000	676	2,369
Colorado-Ute Elec. Assn., Montrose	10,155,000		*§	*
Tri-State G & T Assn., Fort Morgan	9,968,000	9,968,000	*§	*
Arkansas Valley G & T, Pueblo	3,500,000		§	§
IDAHO	**$19,456,795**	**$2,412,000**	**6,574**	**15,717**
Northern Lights Inc., Sandpoint	4,678,750		1,187	3,526
Clearwater Power Co., Lewiston	5,517,000	1,660,000	1,941	4,326
Kootenai Rural Elec. Assn., Coeur D'Alene	1,211,000		693	2,223
Long Valley Power Co-op., Donnelly	196,045†		165‡	420‡
Idaho Co. L & P Co-op. Assn., Grangeville	1,435,500	282,000	664‡	1,208‡
Raft River Rural Elec. Co-op., Malta	1,882,500	470,000	493	759
Fall River Rural Elec. Co-op., Ashton	1,435,000		582	1,425
Lost River Elec. Co-op., Mackay	1,327,000		302	936
Prairie Power Co-op., Fairfield	424,000		234	226
Salmon River Electric Co-op., Challis	1,350,000		313	668
MONTANA	**$51,337,034**	**$1,878,000**	**27,136**	**40,657**
Ravalli County Elec. Co-op., Corvallis	871,700		384	978
Sun River Elec. Co-op., Fairfield	2,419,500		1,866	2,365
Lower Yellowstone Rural Elec. Assn., Sidney	1,861,600		1,108	1,578
Yellowstone Valley Elec. Co-op., Huntley	2,025,498		992	2,531
Vigilante Elec. Co-op., Dillon	3,513,000	840,000	1,385	1,988
Missoula Elec. Co.op., Missoula	1,912,000		587	1,242
Flathead Elec. Co-op., Kalispell	2,745,000		747	2,146
Fergus Elec. Co-op., Lewistown	3,271,354		2,362	2,700
Park Elec. Co-op., Livingston	1,545,000		694	1,162
Mid-Yellowstone Elec. Co-op., Hysham	937,000		490‡	886‡
Beartooth Elec. Co-op., Red Lodge	1,235,983		1,010	1,796
Big Horn County Elec., Co-op., Lodge Grass	1,767,000		749	1,400
Big Flat Electric Co-op., Malta	1,599,000		987	900
Sheridan County Elec. Co-op., Medicine Lake	2,715,000		1,940	2,077
Northern Electric Co-op., Opheim	1,918,000		1,052	1,057
Valley County Elec. Co-op., Glasgow	1,254,000	319,000	619	876
McCone County Elec. Co-op., Circle	4,152,399		2,518	2,812
Goldenwest Elec. Co-op., Wibaux	1,139,000		746	741
Glacier County Elec. Co-op., Cut Bank	2,886,000		1,006	3,228
Marias River Elec. Co-op., Shelby	1,911,000		1,021	2,641
Hill County Elec. Co-op., Havre	3,335,000		2,379	1,833
Tongue River Elec., Co-op., Ashland	2,762,000	719,000	1,032	1,276
Southeast Elec. Co-op., Ekalaka	1,701,000		1,118	1,124
Lincoln Electric Co-op., Eureka	1,640,000		295	1,130
Elmo Electric Co-op., Proctor	220,000		49	190
NEVADA	**$ 352,704**	**$**	**165**	**764**
Alamo Power Dist. No. 3, Alamo	99,000		36	96
Overton Power Dist. No. 5, Overton	253,704		129	668

Canada

B. C. Electric

A record breaking amount of close to $70,000,000 was spent in 1956 to provide new electric plant to keep pace with rapidly growing load in the Mainland and Vancouver Island service areas of the B. C. Electric Co. The total system peak load for 1956 was 645,000 kw, which compares with a combined peak of 566,300 kw in 1955 for the two areas which were not interconnected at that time. The total system energy load for 1956 was approximately 12.5% greater than the 1955 load.

The Seton generating plant with one 42,000-kw unit was completed and placed in service in August 1956.

Borrower	Cumulative Construction Loans, 12/31/56	1956 Construction Loans	Miles Energized 10/1/56	Consumers Served 10/1/56
NEW MEXICO	**$71,700,499**	**$7,457,000**	**19,492**	**47,516**
Central Valley Elec. Co-op., Artesia	4,554,000	506,000	1,229	3,370
Roosevelt County Elec. Co-op., Portales	3,144,000		1,444	2,719
Farmers Elec. Co-op., Clovis	5,036,000	801,000	2,517	4,058
Kit Carson Elec. Co-op., Taos	3,042,215	470,000	744	4,916
Otero County Elec., Co-op., Cloudcroft	3,382,183		1,179	3,055
Stonewall Electric Co., Albuquerque	134,498†		119‡	489‡
Mora-San Miguel Elec. Co-op., Mora	1,483,000		736	1,963
Northern Rio Arriba Elec. Co-op., Chama	1,261,800	353,000	278	1,174
Sierra Elec. Co-op., Truth or Consequences	598,000		257	513
Plains Elec. G & T Co-op., Albuquerque	12,950,000	3,905,000	181§	§
Springer Elec. Co-op., Springer	3,478,000		1,309	2,234
Socorro Elec. Co-op., Socorro	4,168,331	592,000	1,044	3,146
Central New Mexico Elec. Co-op., Mountainair	4,403,500		2,310	3,023
Continental Divide Elec. Co-op., Grants	4,042,069	225,000	939	3,484
Lea County Elec. Co-op., Lovington	10,408,000		2,034	5,832
Columbus Elec. Co-op., Columbus	3,715,000		1,011	878
Southwestern Elec. Co-op., Clayton	1,410,000		1,220	865
Jemez Mountains Elec. Co-op., Espanola	4,489,903	605,000	941	5,797
OREGON	**$40,998,833**	**$5,946,000**	**10,038**	**32,954**
Blachly-Lane Co. Co-op. Elec. Assn., Eugene	1,302,000		302	1,237
Consumers Power Inc., Corvallis	7,370,000	1,830,000	1,457	5,054
Umatilla Elec. Co-op., Hermiston	1,443,000		480	1,826
Douglas Elec. Co-op., Roseburg	3,284,674	184,000	865	3,682
Malheur Co-op. Elec. Assn., Vale	463,670†		365‡	621‡
Lane County Elec. Co-op., Eugene	3,681,426	339,000	759	5,106
Jordan Valley Elec. Co-op., Jordan Valley	27,584†		4‡	91‡
Coos-Curry Elec. Co-op., Coquille	6,192,604	2,000,000	780	5,194
Sandy Electric Co-op., Sandy	995,875†		222‡	884‡
Tillamook PUD, Tillamook‖	425,000		75	405
Central Elec. Co-op., Redmond	2,207,000	156,000	832	1,908
Wasco Elec. Co-op., The Dalles	2,590,000		1,168	1,598
Columbia Basin Elec. Co-op., Heppner	2,290,000		818	669
West Oregon Elec. Co-op., Vernonia	2,396,000	327,000	468	2,149
Eastern Oregon Elec. Co-op., Pendleton	795,000		241	649
Columbia Power Co-op., Assn., Monument	2,385,000		667	1,031
Midstate Electric Co-op., La Pine	2,040,000		535	850
Harney Electric Co-op., Burns	1,110,000	1,110,000	*	*
UTAH	**$9,819,907**	**$979,000**	**1,915**	**4,360**
Garkane Power Assn., Richfield	3,239,500	410,000	553	1,625
Moon Lake Elec. Assn., Altamont	6,146,000	569,000	1,172	2,333
Beaver Valley Rural Elec. Assn., Beaver City	14,607†		13‡	45‡
Escalante Valley Elec. Assn., Beryl	322,800		110	254
Flowell Elec. Assn., Fillmore	34,000		37	71
Dixie Rural Electric Assn., St. George	63,000		30	32
WASHINGTON	**$39,541,010**	**$2,975,300**	**13,911**	**35,630**
Benton Rural Elec. Assn., Prosser	3,894,500		1,183	3,616
Orcas P & L Co., Eastsound	2,402,600	345,000	324	1,476
Mutual P & L Assn. of Tanner, North Bend	224,219	77,300	45	171
PUD No. 1, Klickitat Co., Goldendale‖	3,150,000		965	2,628
Inland P & L Co., Spokane	7,169,710	643,000	3,636	7,684
Columbia Rur. Elec. Assn., Dayton	1,637,000		836	1,279
Quinault Light Co., Quinault	763,000		35	318
PUD No. 1, Cowlitz Co., Longview‖	201,192†		185‡	680‡
PUD No. 1, Lewis Co., Chehalis‖	467,752 †		330‡	1,817‡
PUD No. 1, Kittitas Co., Ellensburg‖	520,500		239	541
Stevens County Elec. Co-op., Colville	2,243,996†		1,060‡	2,280‡
Chelan County Elec. Co-op., Leavenworth	253,091†		101‡	364‡
Okanogan County Elec. Co-op., Winthrop	390,000	165,000	139	553
Big Bend Elec. Co-op., Ritzville	4,152,000		1,549	2,007
Lincoln Elec. Co-op., Davenport	2,137,000	320,000	1,172	1,141
Nespelem Valley Elec. Co-op., Nespelem	646,000		238	529
Molson-Chesaw Elec., Co-op., Molson	315,000		127‡	157‡
PUD No. 1, Clallam Co., Port Angeles‖	418,214†		75‡	930‡
PUD No. 2, of Grant Co., Ephrata‖	49,280†		24‡	743‡
PUD No. 1, Douglas Co., Bridgeport‖	5,622,000	1,425,000	1,012	4,925
PUD No. 1 of Mason Co., Shelton ‖	230,000		50	120
PUD No. 1, Ferry Co., Republic ‖	2,440,000		527	1,173
PUD No. 1, Pend Oreille County, Newport‖	213,956†		59‡	498‡
WYOMING	**$33,131,217**	**$2,427,000**	**13,832**	**21,808**
Riverton Valley Elec. Assn., Riverton	2,110,000	535,000	1,028‡	1,744‡
Big Horn Rural Elec. Co., Basin	1,935,000	90,000	809	1,610
Wyrulec Co., Lingle	2,381,600	522,000	1,134	2,157
Bridger Valley Elec. Assn., Mountain View	1,397,801		437	850
Wheatland Rural Elec. Assn., Wheatland	1,586,000		1,016	1,113
Lower Valley P & L, Afton	4,206,006		796	3,123
Garland L & P Co., Powell	435,300		198	503
Washakie Rural Elec. Co., Worland	316,500		106	287
Rural Electric Co., Pine Bluffs	4,014,510	950,000	2,330	3,265
Hot Springs Co. Rural Elec. Assn., Thermopolis	2,415,000	330,000	712	634
Carbon P & L, Saratoga	2,072,054		898	1,676
Niobrara Elec. Assn., Lusk	2,376,000		1,436	1,296
Shoshone River Power, Cody	1,365,000		398	508
Sheridan-Johnson Rural Elec. Assn., Sheridan	1,485,000		776	852
Tri-County Elec. Assn., Sundance	4,956,746		1,593	1,962
Sheridan Suburban Elec. Co., Sheridan	78,700†		165‡	228‡

* Not Energized
† Loan Repaid
‡ Estimate
§ Power-Type borrower
‖ Public agency

Construction is now well under way on the Cheakamus development, which involves a 6¾-mile tunnel to divert the water from the Cheakamus River to the power house which will be located on the Squamish River. This plant will consist of two 70,000-kw units both of which are scheduled for initial operation in the fall of 1957.

At La Joie Dam which provides storage facilities for the Bridge River plant, construction commenced in 1956 on the installation of a 22,000-kw generating unit.

Construction of the final stage of the Bridge River development started late in 1956. This project, to be known as Bridge River No. 2, involves a large storage dam in the vicinity of the existing diversion dam, a second tunnel through Mission Mountain and a new power house on the shore of Seton Lake, approximately one half mile west of the present power house. The installed capacity will be 248,000 kw in four units. The first three units are scheduled to be in service in 1959 and the fourth in 1960.

In 1958 a gas turbine plant will be added to the system. This plant will be located near Vancouver and will have four 25,000-kw units. It will be capable of operating on either oil or natural gas fuel.

The submarine cable interconnection between the Mainland and Vancouver Island systems of the company was completed and placed in service in August 1956. This interconnection operates at 132 kv and consists of 25 miles of overhead line and 19.6 miles of submarine cable. This link makes an additional 120 mva available to provide for load growth on the Vancouver Island

Ingledow station is the terminal of the second Bridge River-Vancouver transmission line. The Creekside-Rosedale section of this line was completed in 1956 and placed in service at 230 kv. This line ties in to the existing Bridge River-Horne Payne line at Creekside and the Wahleach-Ingledow line at Rosedale. The Bridge River-Creekside section is scheduled for completion in 1957 at which time the completed line from Bridge River to Ingledow will be operated at 345 kv.

The 97-mile 132-kv line to Powell River was completed in 1956 to supply the Powell River and Sechelt areas. Over half a million kva of new substation capacity are being installed in the Vancouver, Powell River and Vancouver Island areas in 1956 and 1957.—*J. H. Steede, Chief Engineer, Electrical Div.*

ELECTRICAL WEST

Competitive Year Ahead

COMPETITION during 1957 will be tough. Spirited competition for the customer's dollar always will be with us but a new form of competition is looming ahead—the competition to get things done.

The coming months will see a scramble to get labor, materials and money. All of these essential ingredients to progress and growth will be scarce. In fact, there may not be enough of them to go round and fulfill the ambitious plans for expansion of the country's physical plant.

Of the three, the tight money supply is the one to ponder over. It is becoming increasingly apparent that new capital formation in this country is not sufficient to keep pace with the type of free-wheeling, dynamic economy that the country has been enjoying for the past several years. If we are to keep on going and expanding and enjoying more of the abundant life, the machinery for developing sources of investment funds will have to be overhauled and modernized for greater production efficiency.

Barring the use of government printing presses, funds for new capital investment come from some form of savings. The fiscal policies of the federal government are just not geared up to encourage and promote savings on the scale that apparently is required to match the productive growth of the country. Many individuals and associations are advancing all sorts of schemes which will encourage greater savings on the part of the individual and enable corporations to retain funds for reinvestment either through a more equitable income tax arrangement or faster depreciation allowances.

The whole subject is fast becoming a No. 1 civic problem that sooner or later will affect the pocketbook and well-being of every citizen. Business and industry can cope with labor and material shortages in its own area, but on new money matters the federal government holds the whip hand. The policies of the nation's tax makers and tax enforcers, as laid down by Congress, could very easily be the determining factor as to whether or not the economy grinds slowly down to stagnation through lack of adequate financing or rolls smoothly along to the new highs that can be predicted confidently — if national thriftiness is encouraged and rewarded.

Challenging Statistics

TRADITIONALLY the February issue recounts, statistically, the growth and development of the electrical industry in the West. This year's figures are even more interesting and reassuring than ever. Both the present stature and the future prospective growth of the industry west of the Rockies fire the imagination and kindle the enthusiasm of every individual associated with it.

Still more startling is a comparison of the industry figures today and those of a quarter of a century ago. In the five years between 1926 and 1930, inclusive, the electrical utility industry in the 11 Western states spent $639,500,000 on new physical plant, part of which was represented by 1,466,733 kw of new generating capacity. In 1955 the electric utilities spent almost exactly the same amount of money, $646,700,000 to be exact, which amount was required for new facilities including 1,869,149 kw of generating capacity. Significant are the facts that the utility industry is spending dollars at a rate five or six times that of the booming 1920s; that the dollars are buying approximately the same number of kilowatts of physical plant as they did 25 or 30 years ago; that the dollars themselves are worth only about 60 cents in the terms of 1929 purchasing power.

The moral to this bit of statistical information probably would require an average-sized economic textbook to explain in full. Suffice to say there is hardly better evidence anywhere to sub-

EDITORIAL VIEWS

stantiate the benefits of aggressive research, open-minded engineering, hard-driving selling, and far-sighted management — all of which are the essential ingredients in the flowering of the free enterprise system. And the electrical industry might well challenge any other segment of the American economy to equal that record.

Our Hydro Assets

THAT hydro power will be all played out in the next ten years is a generalization that finds itself in many a luncheon conversation. The statement is correct in that the really economical sites will be scarce in ten years. But hydroelectric energy will be progressively increasing in value.

The base load hydro system on which the West was built is destined for extinction. In many areas the transition to fuel-based power has already taken place. Successful economic exploitation of the atom will speed the day when hydro power assumes its new and influential role in system operation.

The fact that large atomic or fossil fuel plants operate most efficiently at full capacity and without interruption is the key to hydro's increasing value. Stored energy thereby becomes a highly important asset to serve peak demands at a minimum investment charge.

Fred Groat and M. J. Shelton of the California Division of Water Resources, in discussing the future of hydro to the California water plan, suggested that hydro might even be used extensively (and economically) in conjunction with pumped storage. Pumped storage plants using 1½ kw of low-cost, off-peak power to pump water which would produce 1 kw of peak power, may well be attractive as the ratio of hydro-to-steam decreases.

Hydro power will play an important part in the West for years to come in supplying both base load and peaking power. The important aspect of this is the advantage that the West enjoys in having, literally, reservoirs of energy that will permit the region to continue to take full economic advantage of any and all future combinations of demand and supply of its power requirements.

People's Capitalism

An Explanation

FIRST, it is the recognition of the worker as a consumer, with wages as high and hours of work as low as productivity will permit.

Second, a constant search to increase productivity per hour of work through applied scientific research, engineering, managerial skill and capital investment.

Third, a competitive society in which the consumer is free to buy what he will and where he will, and with industry competing for the consumer's favor through making goods more desirable or less costly.

Fourth, recognition of growth as a national characteristic, and that growth comes from better plants, better machines, better trained workers and better products. Also essential to the concept of growth is the principle of modest profits with increasing turnover of capital rather than the limiting of volume through large per unit profits.

A corollary to the foregoing is the obsolescence of equipment before it is worn out if more efficient and productive equipment is available.

Which means that constant reinvestment of a sizable proportion of profits is necessary to provide for improvement and expansion.

—Theodore V. Houser, Chairman of the Board, Sears, Roebuck & Co. Reprinted from the Weekly Report of the U. S. Chamber of Commerce.

"We back every Spang Conduit installation we make with a One-Year Unconditional Guarantee!"

says Mr. R. C. Jackson
Cahn Electric Co.
Shreveport, Louisiana

Billy E. Arnold unloads conduit which has been stored outside for several months. HD galvanized finish is highly resistant to corrosion, despite exposure to elements.

"That shows our confidence in SPANG Conduit. Of course, we expect it to last a lifetime. A *top-quality* conduit like SPANG means longer service life, fewer rejections, less installation time and more satisfied customers. That's why we use SPANG on 90% of our installations, and on many of our larger jobs requiring a carload or more we use it exclusively."

The new Shumpert Hospital installation

Cahn Electric has installed over 70,000 ft of SPANG HD Galvanized Conduit at the new Shumpert Hospital, Shreveport, Louisiana. This $10-million, 300-bed hospital will be completely furnished with the latest electrical equipment from an audio-visual nurses' call system to closed circuit TV in the cobalt treatment room . . . from the emergency power system to iron lungs. SPANG HD will give the hospital *top-quality* service.

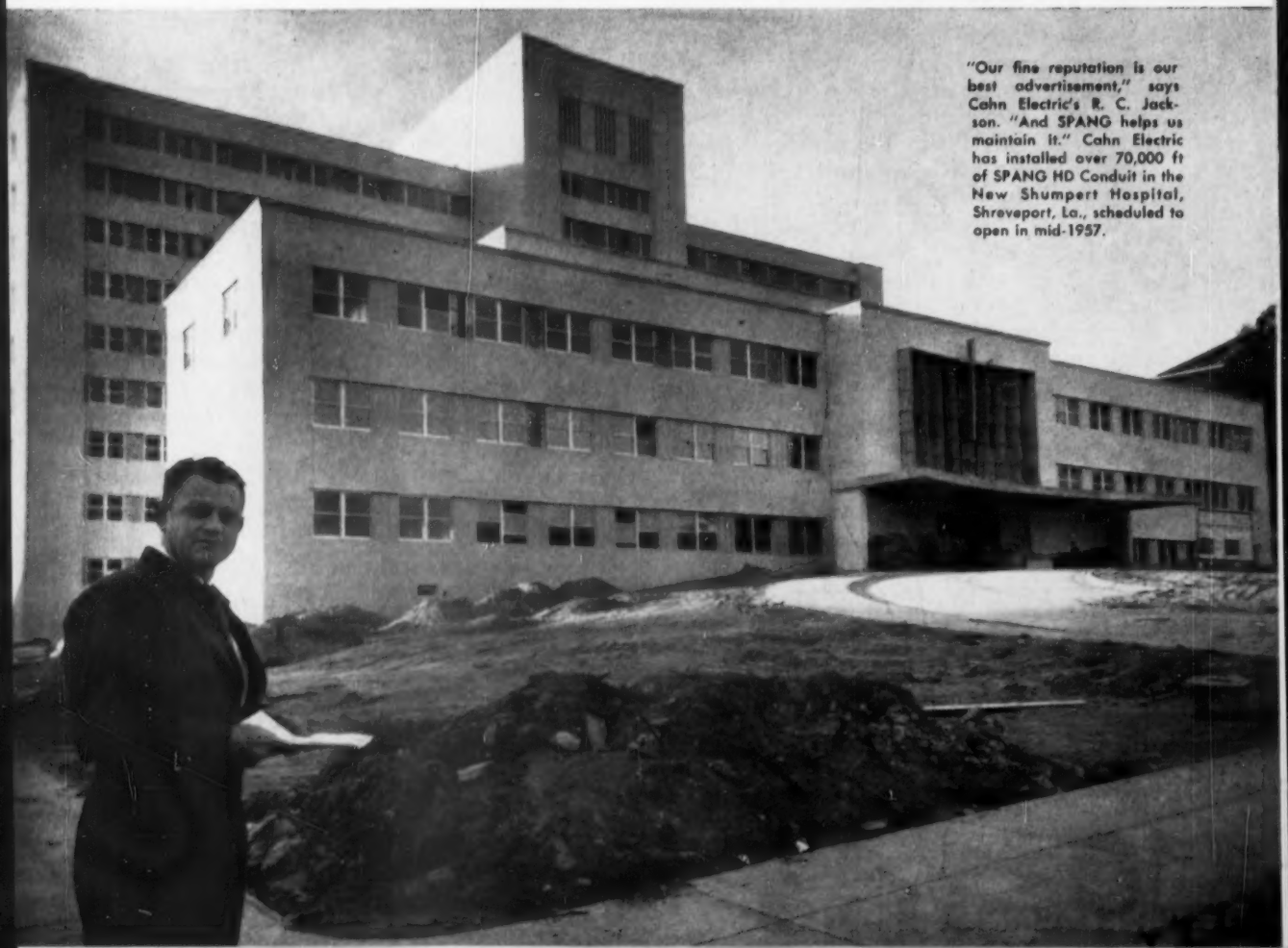
"We were low bidder of six on the project," reports Mr. Jackson. We saved money by ordering SPANG Conduit in carload lots and storing it on location. The conduit was exposed to all the elements, but when we were ready to use the conduit several months later, we found it in excellent condition! Wire pulling was easy as ever, and no rejects!"

Let SPANG guard your reputation, too!

SPANG HD Conduit is easy to bend, thread and cut . . . is highly resistant to corrosion . . . offers years of *top-quality* service in any installation. Make SPANG HD your first choice every time. Your local SPANG Distributor is at your service.

SPANG CONDUIT

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE
TWO GATEWAY CENTER, PITTSBURGH, PA.
District Offices and Sales Representatives in Principal Cities



"Our fine reputation is our best advertisement," says Cahn Electric's R. C. Jackson. "And SPANG helps us maintain it." Cahn Electric has installed over 70,000 ft of SPANG HD Conduit in the New Shumpert Hospital, Shreveport, La., scheduled to open in mid-1957.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Figure this out

Contractors shouldn't be afraid of figures; they are always asking to figure a job, aren't they? Likewise to find quicker ways to figure? Well, to understand what all the big figures in this issue may mean to you here is a simple rule of thumb---

$1,000 per kw

For every kilowatt of generating capacity that your local utility adds there must be at least $1,000 of wiring and equipment sold to the customer who uses it. It is costing the utility money, borrowed at interest, to put in that capacity and the distribution equipment to reach the customers. With the pressure of that investment and the need for revenue to pay that interest, there is bound to be a tremendous drive to sell customers on using kilowatt-hours. To use them, they require appliances, motors, equipment, fixtures, lamps and wiring to connect them to the meter. That's your market!

Your allies

National Electrical Week and the Live Better...Electrically programs will help contractors and suppliers to reach that market by creating a stronger public demand for electrical service through just such equipment and wiring. This year's LBE was launched with another nationwide TV meeting on Jan. 30. Electric Week is Feb. 10-16. Get on that bandwagon, let your town know it in a hundred ways, and let it attract business to you. You'll need it to sell the increased costs.

Light rises

Lamp prices went up about 8 to 9% as General Electric led the way Jan. 24. The 100-w incandescent went from 22 to 23¢, standard 40-w fluorescent from $1.15 to $1.20. Because production has increased with demand the de luxe and 8-ft. slimlines dropped a little. New mechanization has made this possible while incandescents are already mechanized.

All but copper

Except for copper wire price increases have been continuing in almost all electrical supplies. Wire reflects the decreased demand for copper which had been bid up high on the world market. Materials reflect higher labor cost, freight rates, raw materials.

Inflated wages

Electricians' wage rates went up quite a jump both in pay and fringes the first of the year in some areas, particularly in the San Francisco Bay region. Others go up in February. By the end of June, when many agreements are renegotiated, a disproportionately big increase is being demanded by all the IBEW locals. Some reach pretty far for a fringe, too, such as full pay while serving on jury duty.

More unity

An area-wide uniformity for the San Francisco Bay region seems closer than before. The area labor-management committee at least reached common ground on some recommendations both to the local unions and the NECA chapters. The union representatives demanded the same as the plumbers in San Francisco, all in one big swallow. Employers want it in smaller bites over a two-year period so that it can be digested without causing the whole building business to react with reverse perastolsis.

Catching up

Colorado and Wyoming will have a wage increase of 40¢ an hour beginning March 31 on a new one-year contract just signed by the Rocky Mountain Chapter of NECA with IBEW locals. Scale will be $3.40 for inside journeymen. Outside men will get $3.15, a 25¢ an hour increase in Colorado and $3.05, also up 25¢, in Wyoming. Wyoming inside electricians are under a two-year contract that still has a year to run. The Colorado locals were under a three-year contract during which there had been no increase.

Weather payoff

Dry weather in most of the 11 Western states has been a break for electrical contractors with jobs to finish, even if it may have meant a water shortage this year. As a result some contracts have perhaps come out a bit better than they looked at the time they were bid. It is on gambles such as this that contractors hope to come out.

Busy dates

February, March and April are the meetingest months. May is no slouch. Those that might be of interest to contractors are: Business Development Section of PCEA in San Francisco, Feb. 28-March 1. The adequate wiring and commercial and industrial wiring groups have contractor interest. Those doing line work will find the PCEA Engineering and Operating Section meeting at the Statler, Los Angeles, March 21-22 of interest. The series of Illuminating Engineering Society regional conferences begins March 28-29 in Victoria, April 3-5 in Los Angeles and 11-13 in Albuquerque. In April the annual chapter meetings of the inspectors usually are held in Utah, Idaho, Montana and Nevada. The Electrical Maintenance Engineers hold their conference at USC, Los Angeles, April 16-18 and contractors doing industrial work are prominent in that organization. Spring Fair at San Diego April 23-28 will have a large Contractors' Division exhibit. NELPA Engineering and Operating Section meets at Sun Valley April 24-26. The Business Development Section meeting is in Vancouver May 6-8. PCEA annual convention is at the Fairmont, San Francisco, May 15-17, and NECA will hold its combined Districts 6, 8 and 9 annual conference at the Multnomah Hotel, Portland, May 20-22.

Want 100-amp

Reversing previous stands, the PCEA uniform code meeting in Bakersfield Jan. 7 with both northern and southern committees voted 16 to 6 to recommend including a 100-amp service requirement as a minimum in the uniform code. The northern group had previously split 5 to 5 on the matter. The recommendation goes to the board of directors before it can be included in the 1956 edition to match the 1956 national code.

Carry on

California-Nevada Conference of NECA Chapters will continue in existence with the primary aim of working together on legislation. However, the District 9 vice-president will automatically serve as chairman. Al Berg of Los Angeles had been chairman up to the formation of the new District 9. R. Goold, District 9 vice-president, becomes the new chairman. It was voted to continue support of the Construction Industry Legislative Council and reimburse the Northern California Chapter for services on the latter council by the chapter manager, Ernest Kramm.

Moves

Vancouver Electrical Assn., the contractors' organization, has moved from 535 Homer St. to Room 706, 509 Richards St., Vancouver, B. C.

Western president

Harold S. Moor, who manages Utah Fire Rating Bureau in Salt Lake City, became president of the International Association of Electrical Inspectors with the annual election of officers in January. He is also president of

the Northwestern Section. A University of Utah 1934 electrical engineering graduate, his first job was that of valuation engineer with Utah Power & Light Co. He later joined the Board of Fire Underwriters of the Pacific, which has now become decentralized into fire rating bureaus. He became manager of the bureau Sept. 1, 1949.

Pioneer passes

Walter J. Walsh, electrical engineer who became a trade association attorney and expert on antitrust law, succumbed to cerebral hemorrhage Jan. 4 after almost a year in a coma from the same cause. He had worked for some of the pioneer utilities in the San Francisco region, likewise on the electrification of the Milwaukee Railroad for Montana Power. For years he was legal counsel for the San Francisco Electrical Contractors Assn. and other electrical groups. He defended the association, helping to secure dismissal of the antitrust action against it in 1941. With him, went a rich lore of the early history of the electrical industry in the West.

Hit it again

A new federal construction contract act will be introduced at this session of Congress. In fact, Representative Thomas Lane of Massachusetts introduced HR-304 that was identical to S-1644 in the last Congress. The mechanical specialty contracting industries group is endeavoring to meet all legitimate objections to the former act and incorporate them in the new proposal. The measure was aimed at eliminating bid shopping and bid peddling on federal public works.

Separate shows

Recent formation of a number of independent electrical contractors associations has been worrisome to NECA. In some cases, it might weaken NECA's position as the bargaining agency with the union on wages and working conditions. Formation of joint industry boards for the financing of apprenticeship programs and of industry promotion is certainly weakened by such splinter organizations.

Carry the load

With joint industry boards they hope to accomplish by union agreement what has not been possible to sell through association membership. Support of joint apprenticeship training is one. Financial support to the industry's Live Better...Electrically promotions, legislation and educational work on estimating and accounting has been borne by too few for the benefit of too many.

Huddle soon

Chapter Managers Institute of NECA will be held March 4-6 at the Netherland-Hilton Hotel in Cincinnati and a number of the Western chapter managers will attend. Joint industry boards will be one of the major topics of discussion.

New men

Two new chapter managers have been announced for NECA chapters. Robert Colburn is the new manager for the Redwood Empire Chapter, headquarters at San Rafael. George Flint is a new chapter manager of the San Joaquin Valley Chapter with headquarters at Stockton. Gil Froelich resigned.

Expand, relight

Newberry Electric Corp. has added a new 40x120-ft. warehouse to its present headquarters plant and office building at 1038 Venice Blvd., Los Angeles. It likewise added recently a one-story drafting section complete with roof garden on top and a Wakefield luminous ceiling inside. Carlisle Bailey, executive vice-president, says that plans are under way to extend the luminous ceiling throughout the engineering department.

Show how

Portland's electrical code since Jan. 1 requires a 200-amp meter base. Consequently, when the Live Better... Electrically program was presented Jan. 30 an exhibit was staged to show members of the industry the meter bases and wiring devices required in the new rules.

Moved ahead

Home Lighting Fixture Month will be held in September 1957 instead of October. The American Home Lighting Institute will tie it in more closely with National Home Week in that same month and do extensive national advertising.

Men and jobs

Some changes made: Ken D. Cummings from San Francisco has been moved to Seattle, representing Thomas Industries Inc., maker of Moe Lighting and Star Light fixtures. He will cover the states of Washington, Oregon, northern Idaho and western Montana. . . William Watson becomes the San Francisco area representative for Ray J. Noel Inc., which represents Advance Transformer and other lines. He has been in Los Angeles as assistant sales manager. . . H. D. Easterbrook, representing Allen-Bradley and Sorgel Electric, has added W. B. Busdard to his staff. The latter comes from Phoenix with a consulting engineering firm and with Westinghouse. . . Dudley O. Moore, who was with Benjamin Electric Mfg. Co. in Oregon, has joined the San Francisco consulting engineers, Svedrup & Parcel. . . Dan Rashall has resigned as national sales manager for Sunbeam Lighting, Los Angeles. . . Robert Thallon, design engineer at Fluorescent Fixtures of California has resigned.

NAED meetings

Area meetings of the National Association of Electrical Distributors start in February in the Northwest. While dates and places had not been decided, meetings were contemplated in Seattle and Portland in February, and San Francisco late February or early March. The southern California meeting was definitely set for Disneyland Hotel, March 29, according to William Jewell, managing director of the Pacific zone. National convention of NAED will be in Washington, D. C., the week of May 30 after which a second round of area meetings will be held during June and July. The annual convention this year will be Sept. 9-11 at Hotel del Coronado.

Obituary

Deaths reported recently include Dr. Erwin F. Lowry, Sylvania Electric Products research engineer and manager of its laboratories at Salem, who had only recently made a trip throughout the Western states. He was the one who first announced electroluminescence at the IES convention at Pasadena in 1950. . . J. Ross Bryant, credit manager for Anaconda Wire & Cable Co. died recently. . . William J. Larsen, shop superintendent for Pacific Electric Motor Co., died Dec. 21. . . Howard Nicholson, electrical inspector, city of Vancouver, died recently.

Bond contractors

A financial responsibility act is being considered in Utah. It is receiving support from contractors, builders and architects among whom it is being circulated. It would require bonding of builders against nonperformance of contracts. Those paying for construction work would be safeguarded against misrepresentation. Similar laws are now in force in Arizona and Nevada. Specialty contractor bonds would run between $500 and $2,000.

Pump up sales

May will be National Water Systems Month and special promotions on the selling of electric water systems will be sponsored by utilities, REAs and farm equipment dealers with the help of the Plumbing & Heating Industries Bureau. A recent survey of the industry by the bureau indicated the plan is being used and is popular in rural districts.

Announcing the new General Electric

WHITE MERCURY LAMP

YOU and your customers can use the new General Electric *White Mercury* Reflector Lamps *in existing 400-watt mercury equipment* with no change or added investment in operating equipment.

1 GET UP TO 63% MORE LIGHT ON WORK FROM PRESENT FIXTURES: Because a brand new phosphor generates more white light than ever before you get from 7% to 63% more light on the work, depending upon the lamp type being replaced. (See below).

2 GET UP TO 33% LOWER COST OF LIGHT IN EXISTING INSTALLATIONS: With this increased efficiency, unit cost of light can go down from 7% to 33% (See below)!

3 GET LOWER INITIAL COST FOR NEW INSTALLATIONS: You can get *more* light from the same number of fixtures, or get *equal* light with up to ⅓ *fewer* fixtures!

All this is possible with new General Electric *White Mercury* Reflector Lamps because of a specially designed strontium magnesium orthophosphate phosphor. This phosphor converts ultra-violet radiation into more white light than ever possible before. It's also an efficient reflector—sealed in against dirt and fumes.

You and your customers can gain these advantages *now* by replacing present mercury lamps with the new G-E H400 RW-1. Also available in the bulged tubular shape, the H400 EW-1. For more information write: General Electric Large Lamp Dept. WE-2, Nela Park, Cleveland 12, Ohio.

ADVANTAGES OF NEW G-E *WHITE MERCURY* OVER OTHER G-E 400-WATT MERCURY LAMPS

NEW RW-1 vs A-1 (clear glass)

- 55% to 63% more light to the work
- 27% to 33% lower cost of light
- Less maintenance
- Whiter "Color"

NEW RW-1 vs E-1 (clear glass)

- 28% to 31% more light to the work
- 16% to 23% lower cost of light
- Less maintenance
- Well suited for use in upward light fixtures
- Whiter "Color"

NEW RW-1 vs J1 (color improved)

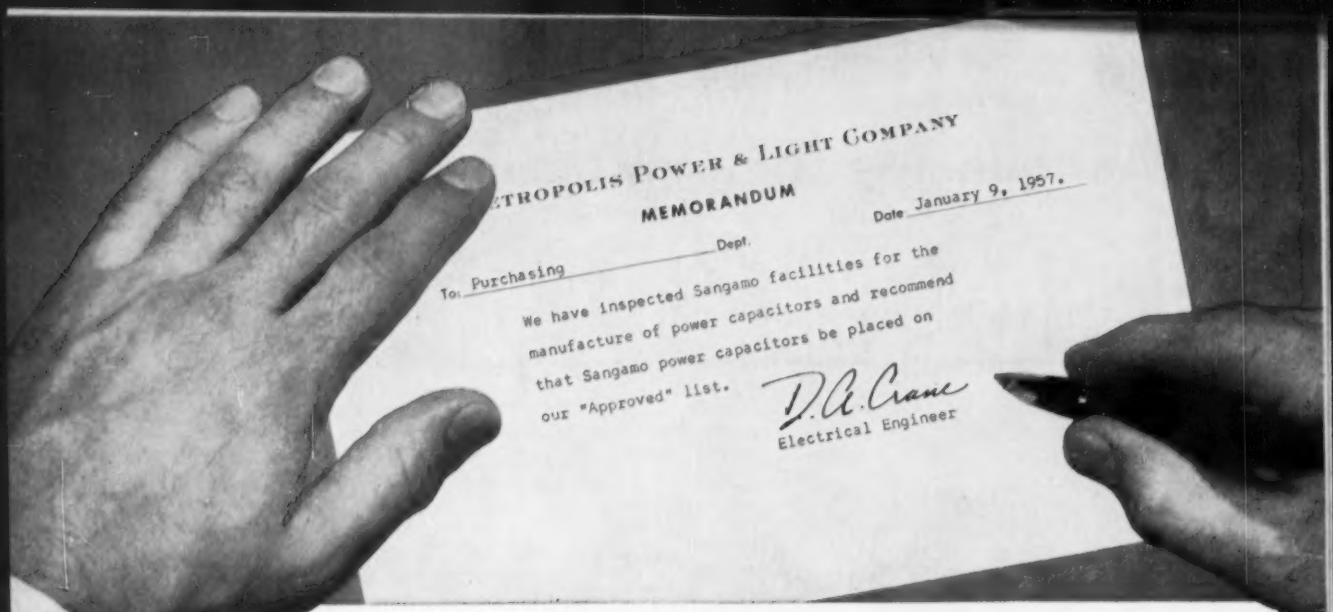
- 37% to 40% more light on the work
- 24% to 30% lower cost of light
- Less color improvement

NEW RW-1 vs RC1 and R1 (reflector shape)

- About 7% more light on the work
- 7% lower cost of light
- Less color improvement for RC-1 users

Progress Is Our Most Important Product

GENERAL ELECTRIC


TROPOLIS POWER & LIGHT COMPANY
MEMORANDUM
Date January 9, 1957.
To: Purchasing Dept.
We have inspected Sangamo facilities for the manufacture of power capacitors and recommend that Sangamo power capacitors be placed on our "Approved" list.
D. A. Crane
Electrical Engineer

SANGAMO CAPACITORS RATE "APPROVED LIST" of most major utilities

PC57-1A

Engineers responsible for the purchase of power capacitors want to *know* how capacitors are made, what's inside them, and why they give assurance of meeting specific service requirements.

To provide this information first-hand, Sangamo, over the past two years, has had its power capacitor processing facilities inspected by engineering personnel of many major utilities. These engineers have placed Sangamo Power Capacitors on the "Approved List" of their respective companies.

Sangamo invites you, also, to investigate its facilities, inspect its plants, and use its capacitors. Ask your Sangamo Representative, or write us for complete information.

SANGAMO ELECTRIC COMPANY, Springfield, Illinois

Group of engineers inspecting Sangamo manufacturing methods. Here they see how bushings are sealed to case by induction soldering.

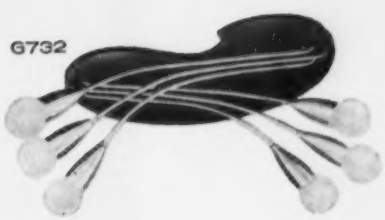
ready for immediate delivery!

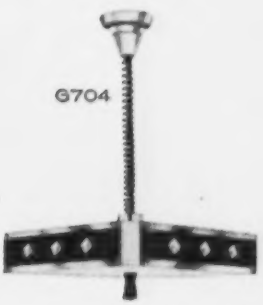
new money makers

You can get excited about these new additions to the Globe lighting line. Designed for dining areas, they feature new approaches in finishes . . . construction . . . illumination.
Specified in new construction, they make homes more salable.
In remodeling, they'll clinch contracts. These outstanding lighting fixtures have "sell" and "satisfaction" built right into them.
And you can have them immediately! Call for your Globe salesman. He will show you the complete new Spring line.

IT'S EASIER TO SELL GLOBE THAN TO SELL AGAINST IT!

from GLOBE





Ready Now! New four-color brochure R-156 with Globe's most popular numbers from our recent catalog. *And*—the new Globe Recessed Lighting Catalog showing many patented features. *Write today!*

GLOBE LIGHTING PRODUCTS, INC., 1710 Flushing Ave., Bklyn. 37, N. Y. • Visit our showrooms: 16 E. 40 St., N. Y. 16 • Over 500 fixtures on display.

"FOR OVER A THIRD OF A CENTURY, PLANNED LIGHTING FOR BETTER LIVING"

NEWEST WESTINGHOUSE TEST CENTER . . .

World's largest transformer laboratory to prove performance beyond 500,000

Here's a Westinghouse investment that is now adding value to every dollar you put into Westinghouse power transformers. In one vast new facility is a combined commercial and experimental testing laboratory at the Transformer Division, Sharon, Pa.

From this ultramodern laboratory, used primarily for research and development, will come transformers of the future. The new anechoic vault, for example, will make complete sound measurements to and beyond 500,000-kva ratings; find ways to throttle structural resonance; ferret out strengths and weaknesses of new core materials and processes; speed inquiry into new methods of reducing vibration and sound.

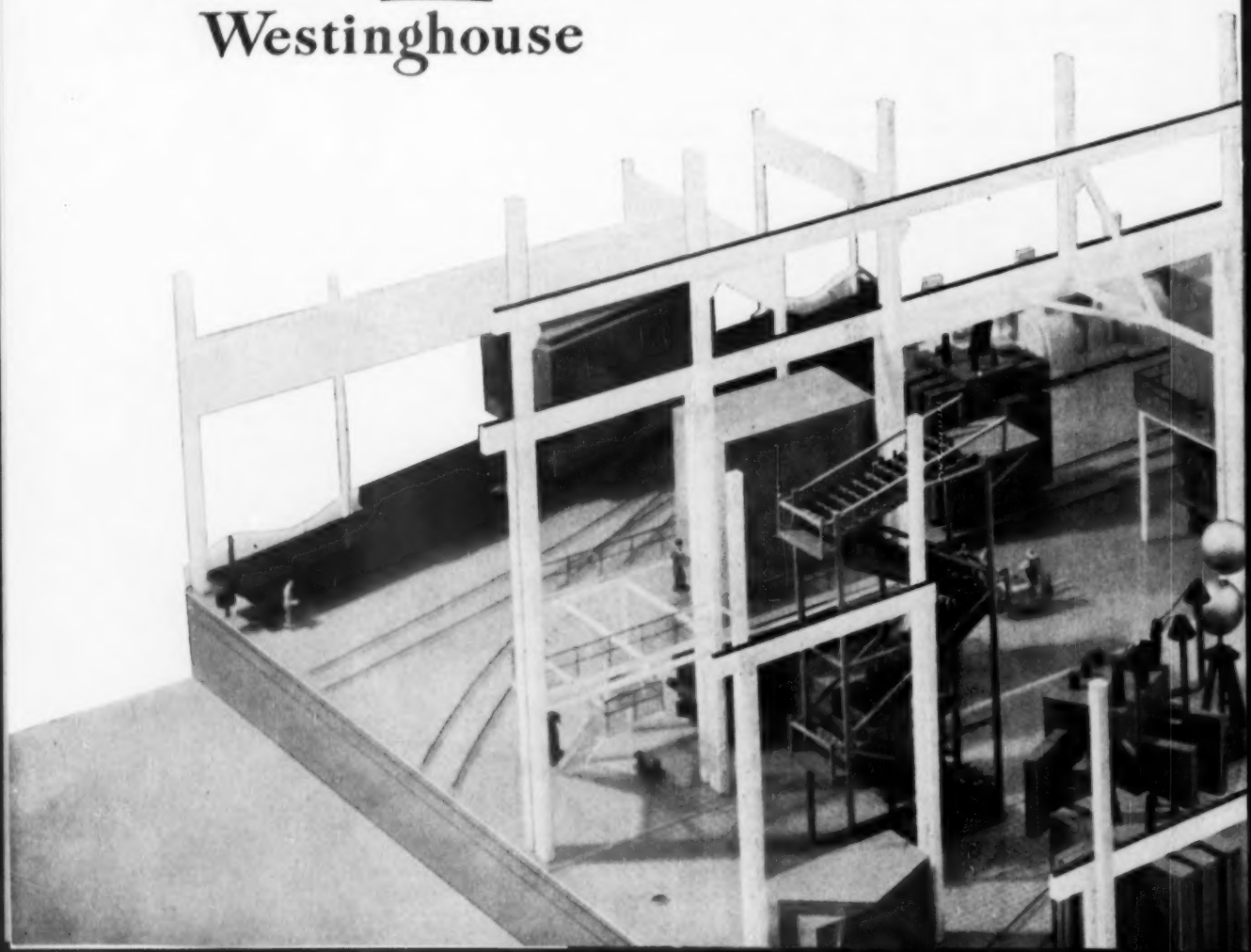
In the high-voltage laboratory, new insulation systems are being developed. Here, models — and full-scale transformers — are tested to destruction. This laboratory is equipped, in fact, to evaluate total electrical performance of the largest commercial units predicted for a decade ahead.

Here today is equipment that immeasurably strengthens the promise of performance in things to come — from Westinghouse.

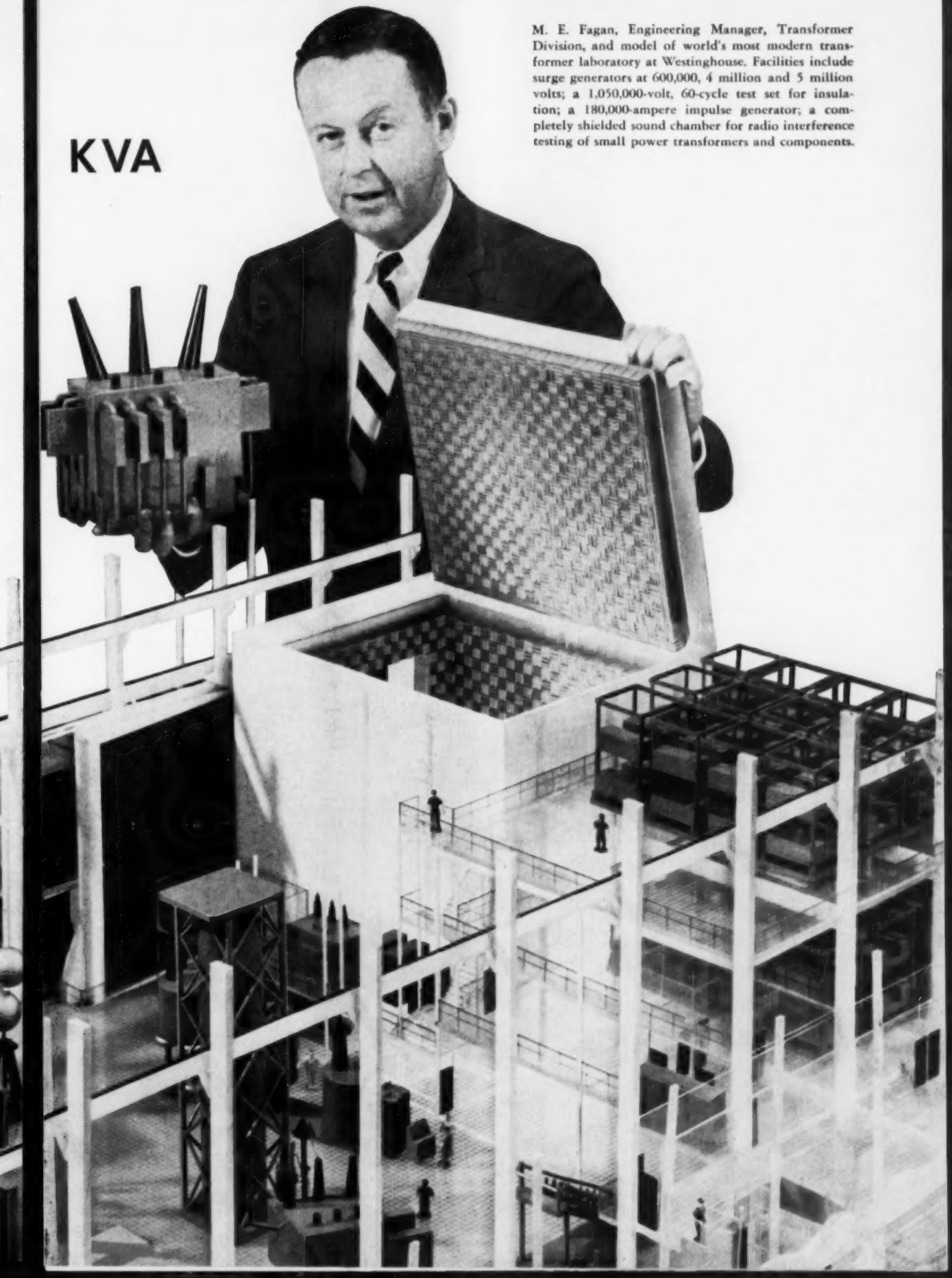
J-70783

YOU CAN BE SURE... IF IT'S

Westinghouse



KVA



M. E. Fagan, Engineering Manager, Transformer Division, and model of world's most modern transformer laboratory at Westinghouse. Facilities include surge generators at 600,000, 4 million and 5 million volts; a 1,050,000-volt, 60-cycle test set for insulation; a 180,000-ampere impulse generator; a completely shielded sound chamber for radio interference testing of small power transformers and components.

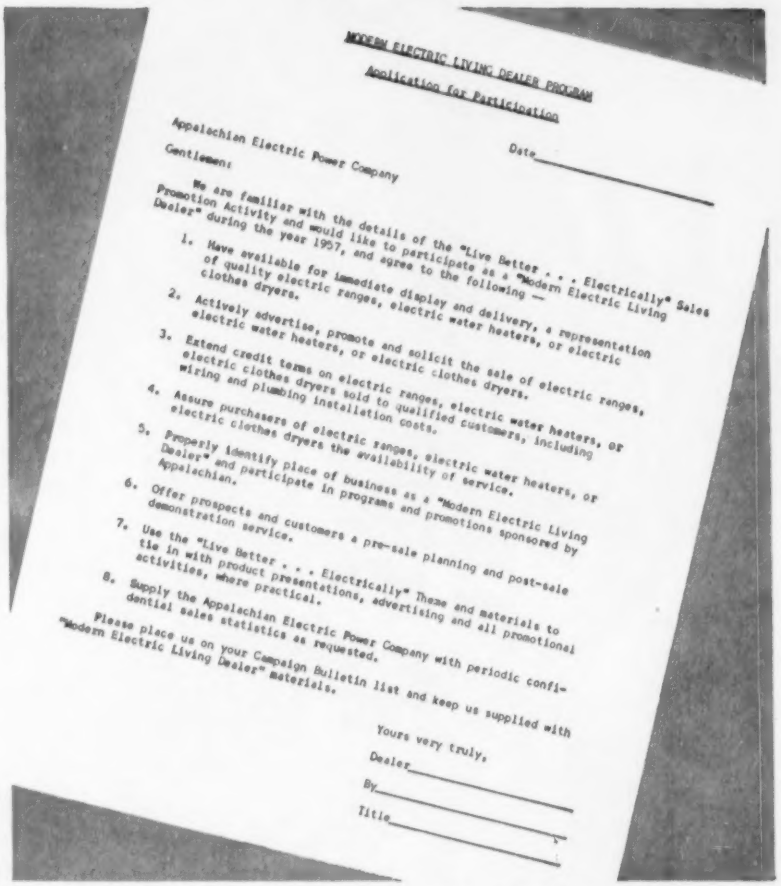
Appalachian Electric Power Sparks 21% Increase in Appliance Sales During 1956

"Live Better Electrically" theme of '57 sales drive

Last spring, 1,250 appliance dealers in Virginia and West Virginia teamed up with Appalachian Electric Power Co. in a full-scale campaign to sell electric ranges, dryers and water heaters. They took full advantage of advertising and promotional materials made available by "Live Better Electrically," and, at year's end, sales totaled 57,950 new units — an increase of 21% over the previous year.

Buoyed by this sales jump, this team — utility, dealers and distributors — is looking forward to greater results from an even bigger campaign in 1957 [illegible] "Live Better Electrically" [illegible] Their sales goal is 60,000 units — and they expect to make it!

Appalachian weaves the "Live Better Electrically" materials into its own continuing promotion. They make profitable use of the powerful selling tools that "Live Better Electrically" provides for local tie-in with the national consumer campaign, and they include HOUSEPOWER as an important element of their well-rounded program. As a dealer incentive, the utility stimulates outstanding sales achievement with cash awards, premiums and [illegible]



MODERN ELECTRIC LIVING DEALER PROGRAM
Application for Participation

Date_____

Appalachian Electric Power Company

Gentlemen:

We are familiar with the details of the "Live Better . . . Electrically" Sales Promotion Activity and would like to participate as a "Modern Electric Living Dealer" during the year 1957, and agree to the following —

1. Have available for immediate display and delivery, a representation of quality electric ranges, electric water heaters, or electric clothes dryers.
2. Actively advertise, promote and solicit the sale of electric ranges, electric water heaters, or electric clothes dryers.
3. Extend credit terms on electric ranges, electric water heaters, or electric clothes dryers sold to qualified customers, including wiring and plumbing installation costs.
4. Assure purchasers of electric ranges, electric water heaters, or electric clothes dryers the availability of service.
5. Properly identify place of business as a "Modern Electric Living Dealer" and participate in programs and promotions sponsored by Appalachian.
6. Offer prospects and customers a pre-sale planning and post-sale demonstration service.
7. Use the "Live Better . . . Electrically" Theme and materials to tie in with product presentations, advertising and all promotional activities, where practical.
8. Supply the Appalachian Electric Power Company with periodic confidential sales statistics as requested.

Please place us on your Campaign Bulletin list and keep us supplied with "Modern Electric Living Dealer" materials.

Yours very truly,

Dealer_____

By_____

Title_____

Dealers pledge active support of Appalachian's "Live Better Electrically" campaign by signing this application form. "Live Better Electrically" sales-promotion and advertising materials will be used in a continuing campaign to boost sales of electric appliances.

utility and its trade allies can profit [illegible] use of the industry-wide "Live Better Electrically" program is typical of the many successful campaigns sponsored by electric utilities throughout the country.

Appalachian's dealer kit for 1957 features powerful local selling tools provided by "Live Better Electrically." Included are materials for newspaper ads, publicity, handouts, displays, die-cut emblems, mailing pieces, posters, banners, streamers, counter cards, slogans and hang tags.

LIVE BETTER
...Electrically

LIVE BETTER ELECTRICALLY

A united effort by everyone in the electrical industry — utilities, manufacturers, dealers and distributors, builders, contractors — to increase residential load and sales of electrical merchandise.

Mrs. Pernecy Anderson, home economist, as overworked housewife, Rex C. Ward, senior consultant, the husband, Carol Jackson, home economist, owner of a washer and dryer, put on skit at UP&L school to show what can happen when a wife must line dry . . .

Sixteen Tons of Clothes

A song with a moral is promoting the sale of automatic electric laundry equipment in the Utah Power & Light Co. territory. The parody number, *Sixteen Tons of Dirty Ol' Clothes,* points up the action in a skit the company is presenting at cooking schools and appliance demonstrations.

The story is short—and sad for at least one member of the cast. As a record player turns out the melody of the current hit, a tired housewife hangs out her wash. Her husband holds one end of the clothes line and "talks" the revised words. An attractive young woman, dressed to go out, enters other side of stage, quickly transfers her laundry from washer to dryer and leaves. The man drops the [illegible]

The accompanying photo shows the presentation at Tooele, Utah, where approximately 800 attended a two-day cooking school and demonstration. If other home economists want to try out the stunt, Evelyn Hansen, UP&L home service director, says she will furnish the words.

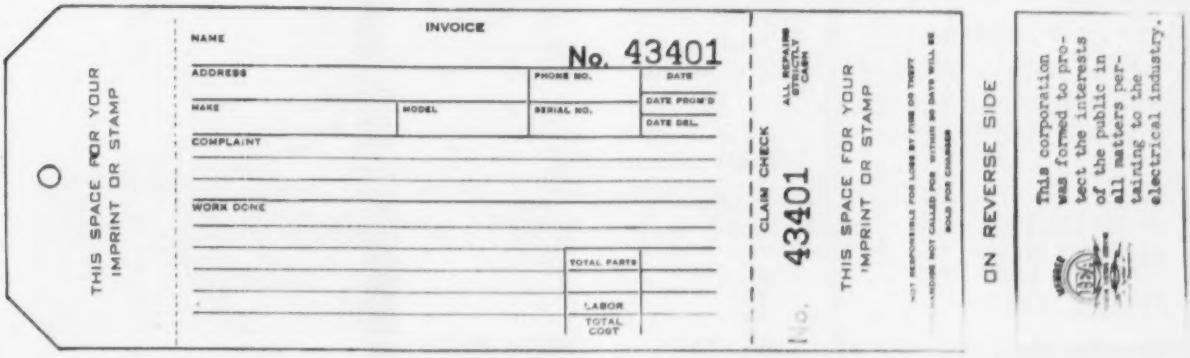
PGE Display [illegible] Sells Idea

[illegible] land last September will be available to homeowners elsewhere in the state through a scale model built by Portland General E ectric Co. The utility is offering for display in home shows, fairs, lobbies and department stores, an authentic scale model of the home, which drew more than 30,000 visitors during a four-week showing. It is accurate even to furnishings.

When assembled the display is 10 ft wide, 11 ft deep and 9 ft high. It can be dismantled so that all its component parts will pass through an opening 22 in wide. The booth is completely automatic and requires no attendant except to start and stop movement by plugging in and out of a 240-v outlet.

The model home has a transparent roof and is situated on a circular bed which revolves through 360°, stopping four times du in ; the seven-minute cycle. While sto ped a transcription explains what the viewer is seeing and 16 full color s'ides point up electrical features. The screen is at the rear of the booth at eye level and a spot focuses light on the section being featured.

Among features emphasized are electric heat, air conditioning, cen[illegible] [illegible] exhibit carries the LBE theme: I fers PGE's wiring financing plan.



Available through the Salt Lake Chapter, IEA, this tag helps dealers keep proper records on appliance repair service. The paper tear-off sheet can be kept in the store and the tag is attached to the article. The customer's claim check has on its reverse the IEA imprint and a notation that it was formed to protect the public in matters pertaining to the industry

AMCO

PLASTIC

CONDUIT

A new concept in conduit. Tough, resilient plastic that can really take a beating. It's so light in weight and easy to install. Labor savings reported up to 75%. Quick, water-tight joints and a material that will never rust or corrode are bonuses that do not cost a cent extra. AMCO PLASTIC CONDUIT is the perfect solution for underground and concrete slab installations.

You will receive a cost study on a typical installation using AMCO, and all technical information available if you send us your name and address.

AMCO PLASTIC PIPE CO.

2002 Davis Street
San Leandro, California

Taken at San Diego's recent Advertising and Sales Club Live Better . . . Electrically meeting, this picture shows some of the people on the program. From left: E. D. Sherwin, president, San Diego Gas & Electric Co.; Marilyn Wickstrom, Miss Live Better Electrically; Howard Carroll, vice-president, Advertising & Sales Club; William O. Kyte, General Electric Co.; E. W. Meise, San Diego Gas & Electric; Bea Knight, California Electric Works, sponsor; F. M. Falge, regional supervisor, LBE project. Speakers told what the program means in dollars to their media

Joan Morgan talks housepower with parents, Mr. and Mrs. Fred Morgan, Phoenix

Who's to Blame?

Even the teenagers got in the act when Arizona Public Service Co. employees took Housepower for their speech class assignment.

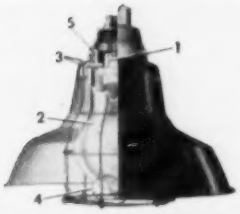
Joan Morgan, daughter of Fred Morgan of the electric department, made a thorough study of housepower before she gave her talk. She interviewed electrical contractors, utility employees, appliance salesmen, building contractors.

Other employees raised these questions: Is America's electrical living dated; have consumers been properly informed on adequate wiring; who's to blame for the "yesterday" type of wiring found in many of today's homes?

That the average utility employee is an information source in his neighborhood was well brought out.

Virginia A. Gries has been appointed PG and E home economist in the Sacramento division. Mrs. Gries formerly was with a Detroit appliance distributor

New CROUSE-HINDS
VAPORMASTER® Lighting Fixtures



1 *Shock-absorbing receptacle* — takes jolts from any direction. 2 *Pear-shaped globe* — plenty of clearence for lamp. 3 *Vapor-tight seals throughout* — fully gasketed construction. 4 *Globe clamping spring* — flips open for re-lamping — no tools needed. 5 *Aluminum adapter-guard* — 2 sizes fit *all* Condulet bodies.

Here is vapor-tight, shockproof industrial lighting engineered for the greatest possible economy and convenience in both installation and maintenance.

In any indoor or outdoor exposure to moisture, rain, gases, dirt, or corrosive vapors . . . a new standard of operational efficiency is set by the new VaporMaster series. Cleaning and re-lamping is done in half the time, *without tools*. Whenever a demand for a change in lighting intensity develops, a simple change of adapters accommodates the larger lamp — without touching the wiring!

Hundreds of fixture combinations may be assembled from 33 standard components to meet your varying needs. Typical choices:

- *Condulet® bodies* in pendent, ceiling or bracket types and with side hubs.
- Adapters in two forms . . . one for lamps up to 150-watts A23 . . . one for 200- and 300-watts PS30 medium base lamps. Sizes may be changed without disturbing wiring merely by installing adapter for the desired lamp.

ASK FOR CATALOG INFORMATION ON THE VAPORMASTER SERIES TODAY

Just call your Crouse-Hinds distributor . . . or nearest Crouse-Hinds office.

A NATIONWIDE DISTRIBUTION exclusively through ELECTRICAL DISTRIBUTORS

NATIONAL ELECTRICAL Week FEB. 10-16, 1957

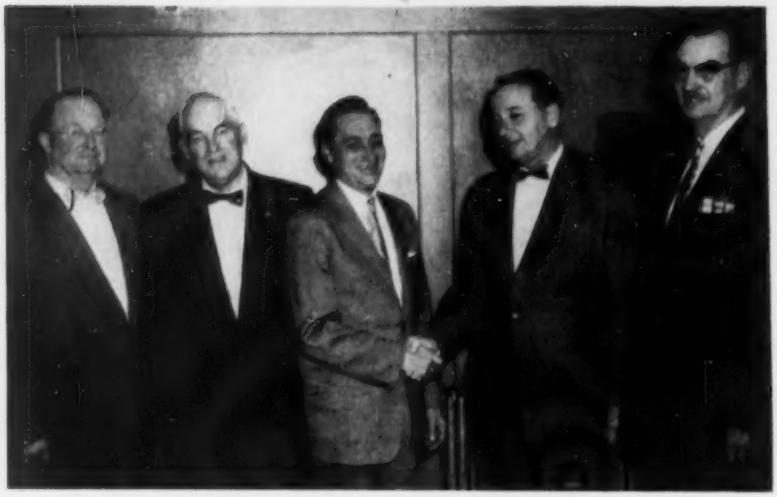
CROUSE-HINDS COMPANY

Main Office and Factory: Syracuse, N. Y.
Crouse-Hinds Company of Canada, Ltd.: Toronto, Ont.

OFFICES: Baton Rouge Birmingham Boston Buffalo Chicago Cincinnati Cleveland Corpus Christi Dallas Denver Detroit Houston Indianapolis Kansas City Los Angeles Milwaukee New Orleans New York Philadelphia Pittsburgh Portland, Ore. St. Louis St. Paul San Francisco Seattle Tulsa Washington. RESIDENT REPRESENTATIVES: Albany Atlanta Baltimore Charlotte Chattanooga Jacksonville Reading, Pa. Richmond, Va. Shreveport

FLOODLIGHTS • CONDULETS • TRAFFIC SIGNALS • AIRPORT LIGHTING

Kickoff Activities



Officers of Snake River Valley Electric Assn.: C. J. Bradford, manager, R. C. Young, treasurer, Harold Toedtemeier, new president, Ferd Koch, retiring president, Paul Worthen, vice-president. Election took place at Twin Falls bus caravan meeting

Leagues

Snake River Valley Electrical Assn. took a bus caravan of officers and members to Twin Falls on Dec. 19 and held its election of officers there with the newly formed Magic Valley Chapter. Groups from the Central Chapter at Boise and the Eastern Chapter at Pocatello converged for the southern Idaho promotional organization, 43 in all.

Harold Toedtemeier, station KIDO-TV, Boise, was elevated from vice-president to president, succeeding Henry F. Koch of Electric Service Co. Paul Worthen, General Electric Co., was named vice-president. James Bruce, Idaho Power Co., secretary, and Rankin Carl Young, electrical contractor, treasurer, were re-elected. C. J. Bradford is manager.

A. S. Gilbert, general sales manager, Idaho Power Co., outlined plans for an automatic clothes dryer promotion beginning in January, in which a dryer a week will be given away for the best letter. A proposal to change the annual conference time from December (See January issue, p 115) to March or November was referred to a committee for study. Larger facilities for the SRVEA office in Boise were also recommended.

Inland Empire Electrical League in the Spokane area elected John Stork of Westinghouse Consumers Division as its president to succeed Joe E. Thomas, manager of Densow's Northtown store. Lester Grimes of Grimes Electric, Clarkston, was elected vice-president. V. E."Mickey" McCain, Graybar Electric, treasurer, and Frank Tool, Washington Water Power Co., secretary-manager, were re-elected. Heading the league's three sections are: J. Birney Blair of KHQ-TV, Spokane, the radio and TV section; W. A. Lowry, Washington Water Power Co., the appliance section; Les M. Stewart, Maxwell's Inc., the supply and apparatus section. Directors represent all branches of the industry in the Spokane, Coeur d'Alene, Colfax, Pullman, Moscow and Lewiston areas.

Intermountain Electric League, with Salt Lake City as headquarters and chapters in Utah and eastern Idaho, named D. L. Holt of Utah Power & Light Co. as president at its annual election of officers, Jan. 4.

Inspectors

Idaho Chapter of International Association of Electrical Inspectors in a quiet sort of way has been carrying on instruction in the code through a series of small meetings in the state, of which one in Nampa, in December, is an example. Park Forte, Boise city electrical inspector, Mark Lundy, chapter secretary, and J. Carl Baldridge, state chief inspector, joined with Clyde Hicks, Nampa inspector, Don Baird of Caldwell and Jes R. Wymer, state inspector at Parma, to form a code question panel. Code discussion and particularly the new 1956 National Electrical Code was held after a brief talk to the contractors present by Ad Woolley, Utah-Idaho Chapter NECA manager, on the subject, "Yes, there is an Overhead." Baldridge announced that the state would soon reissue all pertinent bulletins regarding rules and interpretations and distribute them to all contractors and power suppliers. Forte told of a regular code class in Boise in which 38 are registered.

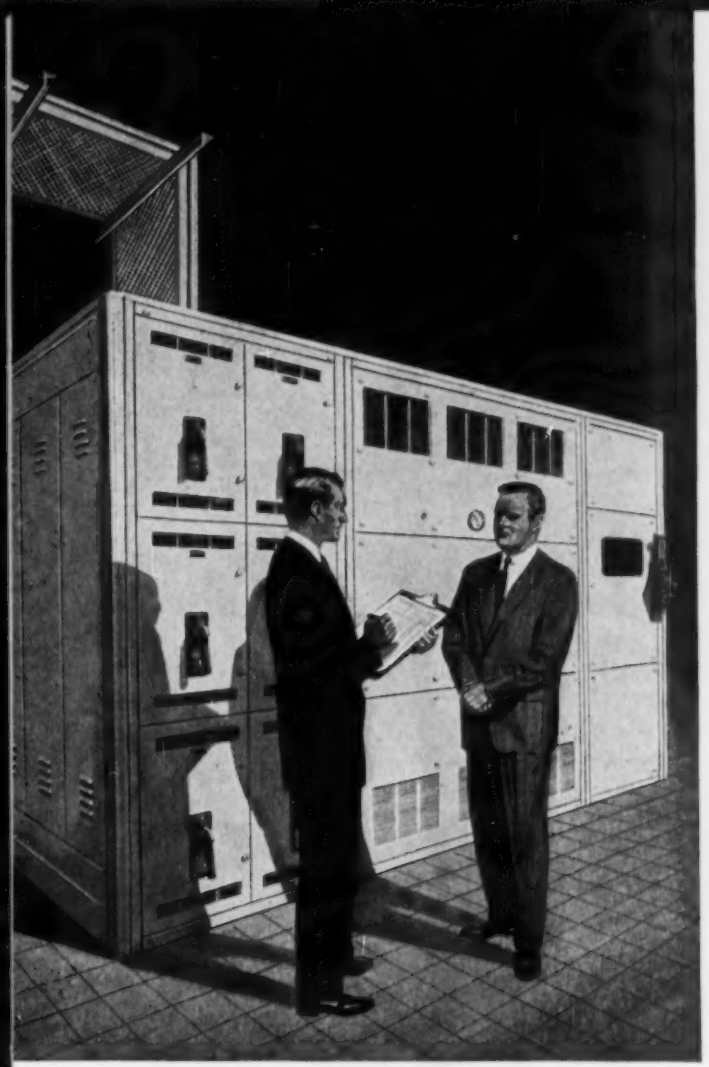
Utah Chapter, IAEI, paid honor to two of its members in the last two meetings. H. S. Morr, Utah Fire Rating Bureau, already president of the Northwestern Section, was acclaimed as the newly elected president of IAEI itself, at the January meeting. At the December meeting Charlie Coleman, retiring as the adequate wiring representative of Utah Power & Light Co., was presented with a watch and scroll of appreciation. The chapter discussed a proposed reintroduction of a state electrical inspection law at the new session of legislature. A. R. Woolley, NECA manager, replaced Floyd Shipp as the Intermountain Electrical Assn. legislative committee chairman and will head the drive to have the once passed law, vetoed by the last governor, reintroduced. In Ogden, William Whetton, that city's electrical inspector, reports that monthly code meetings are now held by contractors and inspectors.

Northern California Chapter, IAEI, meeting in Richmond, Jan. 26, was to hear a report from its committee on table top or built-in range installation. The subject has been one of controversy. In order to develop a logical and uniform policy a special committee was appointed by Chairman W. C. Schwan. That the same problems afflict inspectors everywhere is attested by the inquiries the chapter has received from other chapters and individual inspectors. Officers were to be elected.

British Columbia Electrical Inspectors Assn. holds its annual conference Feb. 8-9 at the Astor Hotel in Burnaby, B. C. Preceded by a tour of electrical installations on Feb. 7, the agenda for the meetings called for discussion on built-in ranges, electronic ovens, load regulator equipment. The Provincial Electrical Department is to give an illustrated discussion on grounding. The Saturday session will be devoted to code interpretation, with L. Robson and L. Ryan presiding.

CMUA

California Municipal Utilities Assn. holds its annual conference in Palo Alto, at Rickey's Studio Inn, Feb. 19-22, Carl L. Richey, Sacramento Municipal Utility District, its



Unit-Versal® Switchboards permit additional capacity in new switches, even switchboard sections, to be added any time.

Vacu-Break® Power Panels feature interchangeable switch units. Switches are horsepower-rated, have interlocked doors.

Industrial Trol-E-Duct® feeds and supports light power tools on mobile trolleys, literally puts power on wheels!

Your BullDog Field Engineer will be happy to give you any additional facts on modernizing your power system. See him.

Power systems made to order for production increases

Expect to increase production now or in the future? If so, your electrical distribution system rates an A-1 priority. It's an area where returns far exceed outlay.

Take a BullDog distribution system, for example. All products are dependably built to perform efficiently, reduce maintenance and downtime. Designs are *flexible* so your changeovers can be made quickly and easily . . . so capacity can be added without obsoleting existing electrical equipment. From safety switches to unit substations, BullDog products are engineered to work well individually or dovetail into an integrated system that performs with top efficiency now . . . suits your requirements for years to come.

See your electrical contractor or consult a BullDog field engineer.

© BEPCO

BullDog Electric Products Company, Detroit 32, Michigan • A Division of I-T-E Circuit Breaker Company. • *Export Division:* 13 East 40th St., New York 16, N.Y. • *In Canada:* BullDog Electric Products Company (Canada) Limited, 80 Clayson Rd., Toronto 15, Ont.

IF IT'S NEW . . . IF IT'S DIFFERENT . . . IF IT'S BETTER . . . IT'S

BULLDOG

ELECTRIC PRODUCTS COMPANY

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

COAST ELECTRIC & MANUFACTURING CO.
1733 N.E. Seventh Avenue, P.O. Box 7712
Portland 12, Oregon

YOUNG ELECTRIC & MFG. CO.
2134 Curtis St.
Denver 2, Colorado

SAFETY SWITCHBOARD COMPANY
910—89th Avenue
Oakland 21, California

BULLDOG ELEC. PROD. CO. OF LOS ANGELES
2885 E. Washington Blvd.
Los Angeles 23, California

Ad Woolley, NECA manager, presents proof of overhead to Nampa contractors

president, has announced. While the association covers all municipal utility services the program will have several speakers on electric power subjects. Samuel B. Morris, consulting engineer, Los Angeles Department of Water & Power, will talk on "Peaceful Uses of Atomic Energy." Harvey O. Banks, director of state water resources, will discuss the Feather River Project. The effect of the state highway program on utilities will be covered by Frank C. Balfour, state department of public works. The effect of recent and proposed FCC rulings on municipal radio operations is the subject of Burton S. Currie, Los Angeles Department of Water & Power communications engineer. "The Potential of Electronics in Utilities Instrumentation" will be told by Robert Rawlins of Dynac Inc., Palo Alto. A trip to Stanford Research Institute and Ames Aeronautical Laboratory will be made Thursday afternoon. Round-table discussions of utility commercial and engineering problems, a session on legislative trends and business outlook are planned.

IES

Plans for the regional conferences of the Illuminating Engineering Society in Victoria, Los Angeles and Albuquerque are taking form and preliminary information about them looks like this:

Pacific Northwest Region meets in the Empress Hotel, Victoria, March 28-30. Kenneth Reid, of the city of Victoria, IES regional vice-president, and A. S. Harris, B. C. Electric Co., Vancouver Island Chapter chairman, have appointed committees which already are making program plans.

South Pacific Region will hold its conference again in the Statler Hotel in Los Angeles, April 3-5. C. M. Thompson, San Diego Gas & Electric Co., regional vice-president, and G. A. Hochenauer, Benjamin Electric Mfg. Co., Southern California Section chairman, have placed William Shalda, Shalda Lighting Co., in charge as general chairman. Audie Ashcraft of Southern California Edison Co., is vice-chairman and committeemen in charge of various functions are: attendance, J. M. Russell; budget, Don Prideaux; entertainment, Lloyd C. Reuscher; finance, Roy Bevan; hotel, Hugh X. Sheeter; ladies, Mrs. Roy Kreyser; papers and program, Roy Jones; publicity, Bruce Corwin; reception, Robert Ford; registration, W. P. Bear; space arrangements and properties, Charles Connely; transporta-

Meetings Scheduled 'til July

February

19-22—**California Municipal Utilities Assn.**, Rickey's Studio Inn, Palo Alto
—**National Association of Electrical Distributors**, Northwest area meetings, Seattle, Portland (Dates and places not determined at press time) San Francisco, area meeting (same)

28 - March 1—**Pacific Coast Electrical Assn.**, Business Development Section, Sheraton-Palace Hotel, San Francisco

March

7—**San Diego Bureau of Home Appliances**, spring conference, House of Hospitality, Balboa Park, San Diego

15—**Intermountain Electrical Assn.**, annual conference, Salt Lake City

21-23—**PCEA**, Engineering & Operating Section, Statler Hotel, Los Angeles

28-29—**Illuminating Engineering Society**, Pacific Northwest region annual conference, Empress Hotel, Victoria, B. C.

29—**NAED** area meeting, Disneyland Hotel, Anaheim

April

3-5—**IES**, South Pacific Coast region annual conference, Statler Hotel, Los Angeles

11-12—**IES**, Intermountain region annual conference, Hilton Hotel, Albuquerque, N. M.
—**Rocky Mountain Electric League**, spring conference, Denver

16-18—**Electrical Maintenance Engineers Assn.** of Southern California, biennial conference, University of Southern California.

April Continued

19-20—**International Association of Electrical Inspectors**, Montana Chapter annual meeting
—**IAEI**, Utah Chapter annual meeting, Salt Lake City
—**IAEI**, Idaho Chapter annual meeting, Boise
—**IAEI**, Nevada Chapter annual meeting

24-25—**PCEA**, Administrative Services Section, La Playa Hotel, Carmel, Calif.

24-26—**NELPA**, Engineering & Operating Section, Sun Valley, Idaho

May

6-8—**Northwest Electric Light & Power Assn.**, Business Development Section, Vancouver, B. C.

15-17—**PCEA** annual convention, Fairmont Hotel, San Francisco

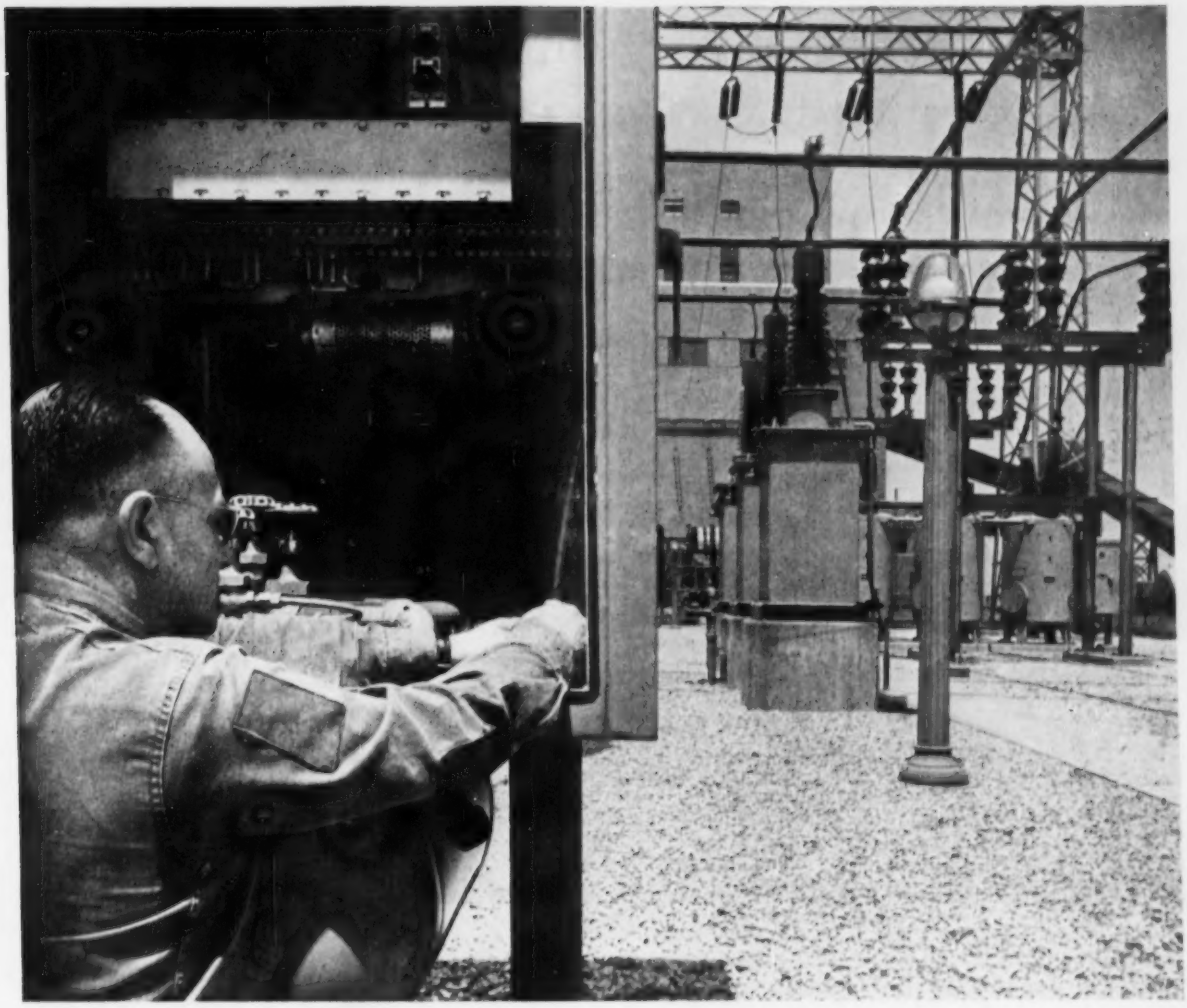
20-22—**National Electrical Contractors Assn.**, annual District 6, 8 and 9 conference, Multnomah Hotel, Portland

20-24—**National Fire Prevention Assn.**, national convention, Los Angeles

June

11-13—**Western Plant Maintenance Show**, Civic Auditorium, San Francisco

20-22—**NELPA**, Accounting & Business Practice Section, Sun Valley
—**NAED**, second group of area meetings (dates and places not yet determined)
—**Los Angeles Home Show**, Los Angeles



Rome station control cable helping Niagara Mohawk to meet load growth

Western New York was stretching its muscles, but it needed more electrical power in order to keep growing.

Niagara Mohawk met this need with a new addition to its power system, a 204,000-kw steam plant right on the edge of Lake Erie—all the power this booming area needed. One of the most modern in the world, the Dunkirk station is wired with Rome station control cables.

Why *Rome* cable?

Well, first of all, because of the proved dependability of Rome thermoplastic control cables, even under tough operating conditions. A sturdy Rome Synthinol jacket provides exceptional resistance to moisture, corrosion, abrasion, and flame.

Secondly, Rome's thermoplastic control cables can be installed faster. They're easier to handle, strip, and splice; and they have a high-gloss, low-friction surface which permits easy pulling through conduit and into control cabinets.

Finally, the use of Rome's tough control cables reduces cable maintenance problems to an absolute minimum. The individual conductors in the Dunkirk installation are insulated with RoLene (polyethylene), which is unaffected by water absorption, electro-osmosis, and low temperatures—conditions that often cause service interruptions.

This Rome cable can be buried in earth, installed in ducts, trays, racks, strung aerially, or run in circuits combining all of these. And it is recommended for operating temperatures up to 75°C. All in all, Rome's station control cable is an excellent choice for demanding applications like this one.

Contact your nearest Rome Cable representative for more information—or write to Department 3, Rome Cable Corporation, Rome, New York.

ROME CABLE

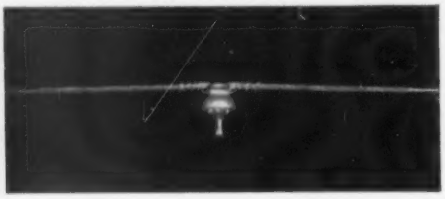
CORPORATION

TURN MINUTES
INTO YEARS OF Protection
at the
vital points of overhead conductors

fine FANNER
SUPERFORMED ARMOR RODS
are easily applied . . . provide positive full-length grip and absolute uniformity of application

Fine Fanner SUPERFORMED Armor Rods offer the economical way for positive, lasting protection of overhead transmission and distribution lines. Their INSTALLED cost is so small compared with the service failures they prevent, it pays to install them at all points where vibration damage is likely to occur.*

Armor rods are easy to apply.



Completed armor rod installation.

Whenever you need accessory items for overhead conductors you'll do far better by standardizing on fine Fanner SUPERFORMED products. Each product in the Fanner SUPERFORMED line is carefully engineered and accurately manufactured. Highest quality materials provide long service life. Special packaging insures safe delivery and protection in storage. With all their extra features, Fanner SUPERFORMED products cost no more than ordinary products.

Armor rods and other products in the SUPERFORMED line are fully described in current literature. Write today for your copy.

*Where spans are short and tensions low, use Fanner SUPERFORMED lineguards.

Licensed for use under patent No. 2,275,019.

THE FANNER MANUFACTURING CO.
Electrical Products Division
BROOKSIDE PARK • Established 1894 • CLEVELAND 9, OHIO
Telephone: SHadyside 1-6000

Fine Fanner Superformed

AGENTS AND DISTRIBUTORS IN PRINCIPAL CITIES

TAP ARMOR PLASTIC FANNGUARDS PATCH RODS FANNGRIPS

tion, Benn J. Hartmann; sergeant at arms, Allison B. Clubley; audio visual aids, Sid Meyerson.

Intermountain Region will meet at the Hilton Hotel in Albuquerque, N. M., on April 11 and 12. Jerry D. Whitnell, Arizona Public Service Co., Phoenix, regional vice-president, and the chairman of the New Mexico Chapter, Robert J. Uhl, have appointed Stanley Bazant Jr. as chairman and Carl R. Albach as vice-chairman of the conference committee. On the executive committee are Vice-President Whitnell, Chapter Chairman Uhl, Robert Detzler, vice-chairman; Robert King, honorary vice-chairman; and Fred Dunn, secretary treasurer. The committee chairmen are: finance, Fred Dunn; registration and reception, E. T. McGillan; papers and program, Carl Albach; entertainment, Joe Pearce; attendance and publicity, Joe Lopez; most interesting lighting job, Bud Boehning; hotel and transportation, Robert Detzler and Ted Douglas; decorations, Gerald Joseph; and ladies committee, LaVerne Knudtson.

EMEA

Electrical Maintenance Engineers Assn. of Southern California alternately stages a big electrical exposition and an electrical maintenance conference. This year is a conference year. It will be held as it was two years ago, in lecture halls at the University of Southern California in Los Angeles, April 16-18. If it follows the pattern of the previous conference there will be parallel group panel meetings to encompass different phases of maintenance engineering, such as instruments, record keeping, electronic equipment, codes and safety orders, preventive maintenance procedure, etc. The conference is in charge of Paul Henrichs of Southern California Edison Co. There will be an opening banquet, exhibits, luncheons during the conference and field trips to large industrials where maintenance programs are in force.

APDA

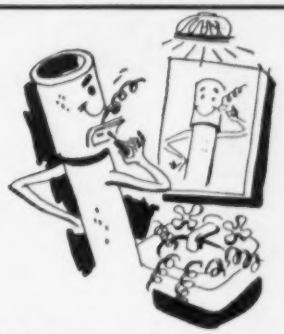
American Power Dispatchers Assn., Southwestern Area, journeyed to Phoenix, Jan. 26, for its winter meeting. S. E. Ealy, manager of power operations for the Salt River Power District, was speaker. He told the history and plans of the Salt River Power Project. A film showing the building of the Arizona Public Service Co. plant at Saguaro was shown and a tour of the dispatching offices in the area was made.

Here's how Rome Cable makes easy-to-use rigid conduit in Southern California plant

High-quality steel. Unlike ordinary "skelp," the steel that goes into Rome's rigid conduit is free of heavy mill scale and pits. Hot-rolled steel is required for Sendzimir hot-dip galvanizing, and Rome Cable further checks its steel for correct thickness, hardness, and surface condition.

Shot blasting improves surface. For improved surface quality, sheet steel is run through a shot blast. This completely removes all oxides, rust, roughness, or dirt, leaving a uniformly clean surface. Stock is then slit to proper widths and cold rolled into round pipe.

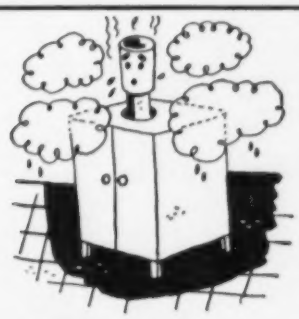
Electric resistance welded for strength. After pipe is cold formed—*cold*-forming maintains uniform thickness—electric resistance welding closes the seam. This process, unique with Rome Cable in the conduit field, produces an uncontaminated weld that's stronger than the pipe itself.



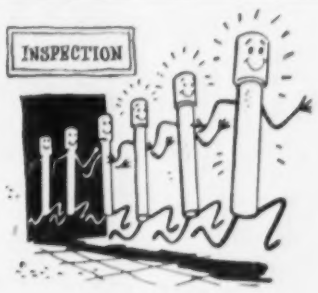
Scarfed inside and out. Next, a scarfing tool removes any and all weld flash from the pipe. Each length is inspected for straightness; and, if necessary, it's straightened on a special machine. After chamfering and straightening, the pipe is ready for annealing and galvanizing.

Sendzimir process begins. First step is flame preheating to burn off dirt, oil, and scale—inside and out. A reducing furnace then anneals pipe, providing a uniformly soft and ductile conduit that's easy to bend. This furnace also cleans pipe, produces a mirror-smooth stain-free surface.

The zinc bath. The pipe goes into the molten zinc at a temperature close to that of the zinc. No pickling or fluxing is required. Each length is exposed to the zinc at a uniform temperature for the same time, assuring a uniformity never before attained in galvanizing rigid conduit.



Sendzimir process ends. After emergence from the hot-dip zinc bath, excess molten zinc is removed from both inside and outside surfaces by an air- and superheated steam wipe.



Final Inspection. The conduit is now carefully inspected—inside and out. *Every single length is individually checked.* This thoroughness assures the closest possible control over quality.

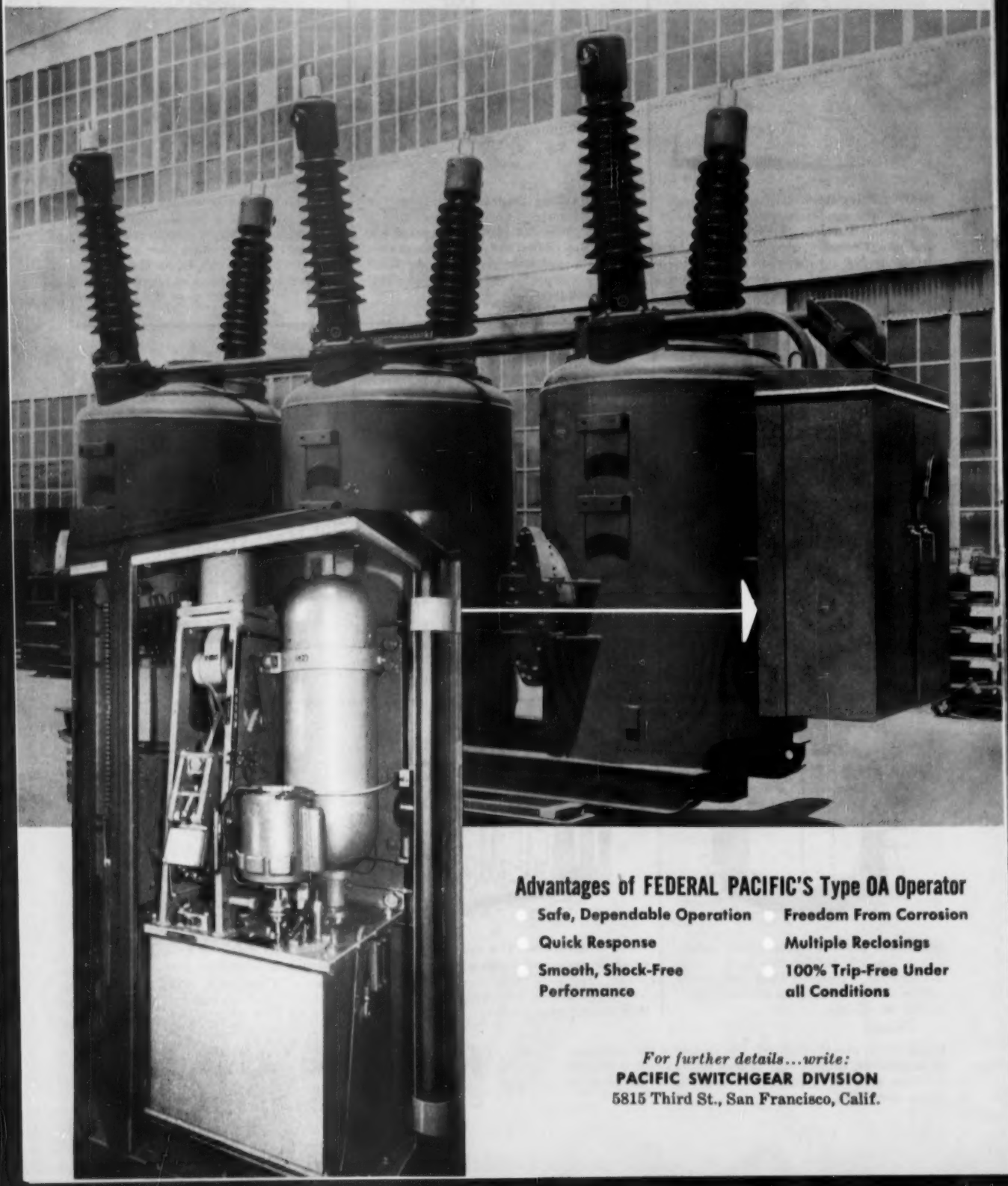
From Rome Cable to you. Color-coded *metal* thread protectors and Underwriters' label are applied, and the pipe is bundled for shipment. Rome rigid conduit is now ready for your use.

If you would like to examine a *free sample* of this premium-grade product, contact your nearest Rome Cable representative—or write to Dept. 944B, Rome Cable Corporation, Rome, New York.

ROME CABLE
CORPORATION

Federal Pacific's

HYDRAULIC



Advantages of FEDERAL PACIFIC'S Type OA Operator

- Safe, Dependable Operation
- Quick Response
- Smooth, Shock-Free Performance
- Freedom From Corrosion
- Multiple Reclosings
- 100% Trip-Free Under all Conditions

For further details...write:
PACIFIC SWITCHGEAR DIVISION
5815 Third St., San Francisco, Calif.

Operating Mechanism

provides smooth, safe, dependable operation under all conditions!

A pioneer in the application of hydraulic principles for more efficient circuit breaker operation—Federal Pacific proved that quicker responsiveness could be obtained and smooth, shock-proof, dependable performance achieved through the use of a *Hydraulic* operating mechanism.

The type OA hydraulic operator, now standard equipment on most Federal Pacific Oil Circuit Breakers, climaxes an extensive development and improvement program in the use of hydraulics over a period of many years.

It is thoroughly tested and proved...and provides maximum freedom from operating trouble while insuring 100% trip-free performance under all conditions.

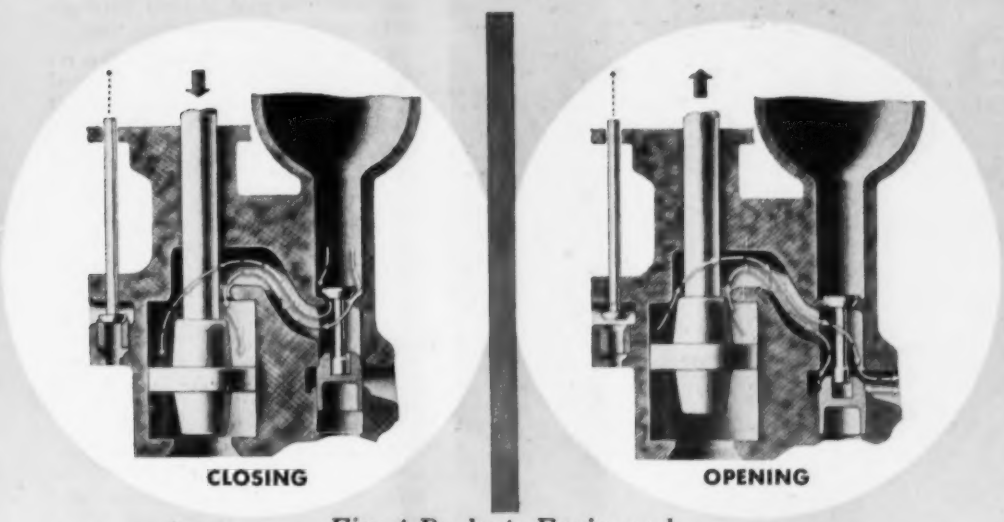
WHY HYDRAULICS ASSURE TOP PERFORMANCE

1. INELASTICITY OF HYDRAULIC FLUIDS PROVIDES INSTANT RESPONSE...the type OA operator, a closed hydraulic system, takes full advantage of this principle to provide immediate stopping or starting action. This permits rapid change in direction in breaker operation during a trip-free action.

2. HYDRAULIC COMPONENTS PERMIT PRECISE MOTION CONTROL... result in smooth performance. Hydraulic damping effect and dash pot action on both ends of the power piston stroke completely eliminate all overtravel. The ease with which opening and closing operations are effected marks a major design achievement.

3. HYDRAULIC FLUIDS ARE NON-CORROSIVE AND ANTI-SLUDGING...because of this, a long uninterrupted operating life without maintenance is assured. The closed hydraulic system prevents condensation, thus eliminating frequent servicing. As a result, complete safety and uniform operation is maintained... and maintenance minimized.

4. UNEQUALED TRIP-FREE ACTION UNDER ALL CONDITIONS ...Hydraulic loading of trip latch permits trip-free performance throughout the entire closing operation and prevents latch chatter. Positive control between breaker and mechanism exists at all times.



CLOSING

OPENING

Finest Products Engineered

FEDERAL PACIFIC ELECTRIC

COMPANY

Main Office: 50 Paris Street, Newark 1, N. J.

Plants at Newark, N. J.; Long Island City, N. Y.; Cleveland, Ohio; St. Louis, Mo.; Dallas County, Texas; Scranton, Pa.; Los Angeles, Calif.; San Francisco, Calif.; Santa Clara, Calif.; Emeryville, Calif.; Affiliated Plant, Toronto, Canada.

THIS MONTH'S NEWS

Public Power Group Wants Columbia Law

Northwest Public Power Assn.'s proposal to create a Columbia River Development Corp. to plan and finance and construct hydroelectric projects and absorb and expand the existing federal transmission system has been formulated into legislation.

A model bill, which NPPA notes is patterned after the St. Lawrence Seaway bill and has been under preparation actively for five years, will be made available to Northwest congressmen for introduction.

The model bill would permit issuing of 50-year revenue bonds for financing power generation and transmission facilities in the Columbia Basin, would leave untouched the construction functions of the Corps of Engineers and the U. S. Bureau of Reclamation and would, according to NPPA, permit marketing of the energy to public or investor-owned utilities. NPPA did not specifically clarify how this marketing policy would be achieved beyond the statement by Gus Norwood, executive secretary, who said this marketing question would remain a matter of local determination.

A five-man board of commissioners, four elected from the four principal Northwest states of Washington, Oregon, Idaho and Montana, and the fifth, the chairman, appointed by the President, would administer the program.

Announcement of the legislative move came close on the heels of an NPA proposal for 10 major Columbia River power and flood control projects NPPA insists should be built in the next 20 years. It was not unexpected, since the plan was known to be approved and waiting a propitious time politically.

• **Colorado** Public Utilities Commission approved the purchase by Public Service Co. of Colorado of the Carbondale Light & Power Co. for $130,000. The small utility has served the western Colorado community of Carbondale since 1911. It serves 280 customers, including 150 within the Carbondale city limits.

This photo shows the "heart" of the sodium reactor experiment of Atomics International, the reactor that will power a generator to be installed by Southern California Edison on Santa Susana Mountain near Los Angeles. Looking into the reactor core, 119 moderator "cans" spaced in the cylindrical tank contain graphite

Feather River Project Is Licensed by FPC

The Federal Power Commission has issued a 50-year license to the Water Project Authority of the State of California for a hydroelectric project on the Feather River in Butte County.

Principal structures of the proposed project are Oroville Dam and two afterbay dams; Bidwell Canyon Dam and Parish Camp Dam; five steel penstocks and a power house containing five turbines, each rated at 118,000 hp, and five generators rated at 88,000 kw each. The authority estimated the cost of the project at about $419,659,000.

The authority proposes to sell the power generated to public agencies in the northern California area and to Pacific Gas and Electric Co. Construction of the project will be financed by the sale of revenue bonds.

Calectric Plans Plant Near Barstow

Plans for construction of a steam-electric generating plant costing in excess of $10,000,000 on the Coolwater Ranch near Barstow were announced recently by Carl C. Ernst, vice-president and general manager of California Electric Power Co.

Calectric has purchased 2,600 acres of the famed ranch which is located west of Barstow and northeast of Daggett. Present plans call for the first 60,000-kw unit to be in service by June 1960.

A second 60,000-kw unit will be constructed a year or two later.

Land development for the power-generating facilities will require about 80 acres, and Calectric is now investigating the possibility of developing experimental crop and agricultural practices on the ranch with the findings to be made available to desert ranchers.

• **A modern** new power dispatching office and office building will be built by the Salt River Power District on a site 100 yards south of the Crosscut forebay, Tempe, Ariz. The new $79,000 one-story building will replace the old power dispatching office now in use on the Crosscut site of the utility.

Paradise Dam Studied By Corps of Engineers

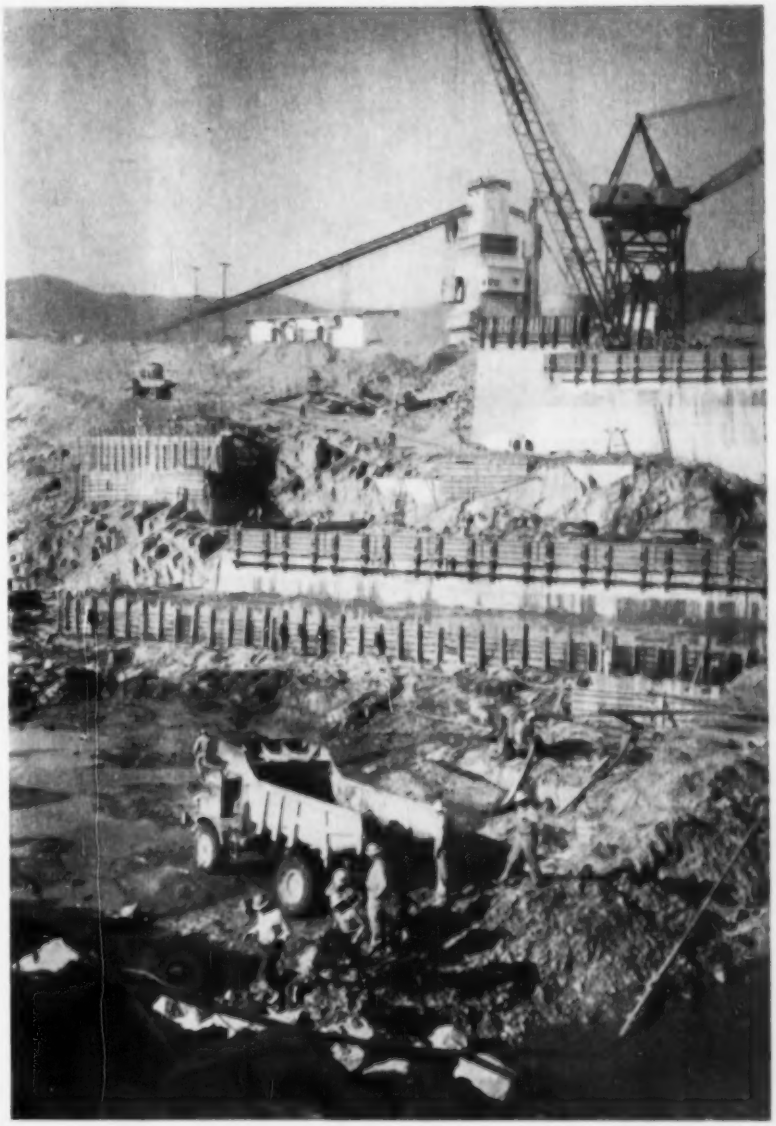
The Seattle, Wash., district office of the Corps of Engineers has been assigned to conduct studies of proposed Paradise Dam on the Clark Fork River in western Montana, according to Col. R. J. B. Page, Seattle district engineer.

The Montana project recently was restored to the Corps' list for study, after having been dormant since 1948 because of local opposition. As originally proposed, it involves a dam two miles downstream from Paradise, Mont., where satisfactory foundation conditions have been found. The dam would create a reservoir with a normal full-pool elevation of 2,700 ft, reaching nearly to the base of Kerr Dam, with 4,080,000 acre-ft of storage.

The power house, as originally planned, would contain eight generating units of 74,000 kw each, for a total capacity of 572,000 kw at a net rated operating head of 204 ft. When upstream storage became available, six more units could be added.

Total cost of the project was estimated at $231,000,000 in 1948.

The project has been opposed in some quarters because its reservoir would flood several small communities, farms and a section of the Northern Pacific Railroad line. The Montana Power Co. had proposed building three smaller dams in the area to provide about 1,500,000 acre-ft of storage.



You are looking toward the northeast bank of the Clark Fork River in Montana, where the first concrete abutment of Washington Water Power's Noxon Rapids Dam is being poured. Workmen at the bottom of the picture stand in an area from which the river has been diverted. Background shows the concrete mixing plant

Columbia River Compact Changed by Commission

The proposed Columbia River Interstate Compact has been redrafted to bar diversion from the upper Snake to the Colorado River system. The anti-diversion clause was one of two major changes made by the seven-state compact commission before approving a final draft to be presented to state legislatures this year.

The other major change simplified provisions for allocating power among member states. The new power section calls for "fair and equitable apportionment and allocation among the states of the hydroelectric power developed in the Columbia River Basin."

It replaces a complicated draft section which attempted to allocate power rights according to the location of dams within states and downstream benefits.

Idaho and Montana delegates were most forceful in asking for both changes in the draft compact. R. P. Parry, Twin Falls, chaired the Idaho delegation to the Spokane meeting, and Glenn H. Larson, Thompson Falls, headed the Montana group.

The anti-diversion clause reads:

"No waters of the Columbia River system shall be diverted out of the Columbia River basin for any purpose except with the approval of all the member states, but this provision shall not affect rights so to divert which are existing on the date of this compact."

The commission also approved a resolution, apart from the compact language, saying members from all seven states "unalterably oppose any move of any kind to divert any water from the Snake River to the Colorado River."

• **British Columbia** Power Commission, Victoria, B. C., has been granted permission to borrow another $15,000,000 by the British Columbia government to finance its Buttle Lake construction and other projects. The commission has borrowed $110,681,369 and has another $45,000,000 to go before it reaches the limit set by the legislature.

STEBER

"SERIES 4000" FLOODLIGHTS

First choice among lighting men for sports, commercial and industrial lighting

"Series 4000" Floodlights are designed to meet NEMA specifications and are available in a variety of beam patterns and with mounting provisions for every application. Write for complete details—See how Steber features provide better lighting at lower cost.

Other Steber Series of floodlights—open and enclosed types from 100 to 1500 watts, are available in deluxe and economy models.

New Floodlighting Literature available now. Write for your copy today.

Lighting Units STEBER for Every Need

STEBER MANUFACTURING CO. • Dept. 57, Broadview, Illinois

STEBER MANUFACTURING CO. OF CALIFORNIA
242 So. Anderson St., Los Angeles 33, Calif.

STEBER-WOODHOUSE, LTD.
33 Ingram Drive, Toronto, Canada

SOLD THROUGH LEADING DISTRIBUTORS

High Dam Backers Hit Hells Canyon License

Backers of a high, federal dam in the Hells Canyon stretch of the Snake River have asked the Oregon Water Resources Board, a relatively new over-all policy commission created by the 1955 legislature, to take jurisdiction on a question whether Idaho Power Co.'s lower-head three-dam plan should be licensed by the state.

C. Girard Davidson, Democratic national committeeman of Oregon and a former under-secretary of the Interior, and Don S. Willner, state representative-elect, also a Democrat, filed the request as attorneys for various groups active in behalf of the high dam proposal. They listed their clients as Oregon State Grange, Oregon State Labor Council, Oregon Farmers Union, Oregon REA Co-operative Assn. and the Hells Canyon Development Assn.

Oregon's hydroelectric commission presently has before it Idaho Power's application for a license to construct the three dams, Brownlee, Oxbow and Hells Canyon, which have been licensed by the Federal Power Commission. Idaho Power has asked for waiver of certain state laws which would affect its amortization schedule and rate structure for the projects.

Supreme Court To Rule On Franchise Tax Case

A decision is expected within 60 days by the California State Supreme Court on San Diego County's appeal from two adverse decisions in the San Diego Gas & Electric Co.'s franchise tax case.

At issue is whether the utility's county-wide operation requires payment of county franchise taxes as an integrated system, according to San Diego District Attorney Don Keller. Keller said approximately $150,000 in taxes and interest for the years 1947 through 1952 are at stake.

The utility previously won verdicts in the case in the San Diego Superior Court and the Fourth Court of Appeals.

During the years involved, the company did not pay the 2% county franchise tax for that part of its system operating in the cities of San Diego, National City and Coronado. The company contends that transmission and distribution lines to and from these cities do not use county right-of-way. The county holds that the company should pay the franchise tax as an integrated system.

"He Builded Better Than He Knew"*

*Ralph Waldo Emerson's "The Problem"

George Stephenson:

George Stephenson's contract for the world's first public railroad was won, in 1829, on the basis of quality and integrity of craftsmanship. Stephenson went on to establish nine major railroads, before his death in 1848. Some of the standards laid down by him, over one hundred years ago, are still in use today.

When Austin Goodyear Day developed Kerite, he too "Builded Better Than He Knew." Early telegraph and railroad signal installations proved that Kerite was completely reliable. Throughout the years, the inherent qualities of Kerite insulation have protected the increasingly heavy voltages of utility power and industrial lines. Pioneers, and all who serve the public, know that time is the measure of a product's value. The proven long-life service of Kerite cable continues as today's standard for major installations around the world.

The value and service life of a product can be no greater than the integrity and craftsmanship of its maker.

KERITE CABLE

THE KERITE COMPANY—30 Church St., New York 7, N. Y.
Offices also at 122 S. Michigan Ave., Chicago; 582 Market St., San Francisco;
3901 San Fernando Rd., Glendale 4, Calif.; 31 St. James Ave., Boston;
4101 San Jacinto, Houston 4, Texas; 1010 Euclid Avenue, Cleveland 17, Ohio;
29 West Lancaster Avenue, Ardmore, Pa.

Founded 1854

MD-4 HYTOOL

no. 4 tap thru 2/0 splice

Now, you can install a wide range of distribution connectors on all conductors up to 2/0 . . . with just a single tool. The new MD-4, with interchangeable jaw inserts, will handle taps, splices, deadends for copper or aluminum through size 1/0 ACSR—or 2/0 for the Hysplices.

Tremendous force — 9,000 lbs. developed by combined cam and lever action—plus the simple change of die inserts—give the MD-4 a versatility never before achieved in a tool of such light weight and low cost.

Accessories include an insulating neoprene cover for the Hytool head, and a canvas carrying bag or steel case. Write Burndy for details.

Die inserts can be changed in less than a minute.

Aligning pins position the jaws—set screws, lock them in place.

BURNDY

56-9

Norwalk, Connect. • Toronto, Canada • Other Factories: New York, Calif., Toronto • Export: Philips Export Corp.

Edison men protect a pole as a home goes up in flames. John England inspects a pole that fell victim to the holocaust

Edison Crews Heroic Fighting Malibu Fire

Southern California Edison Co. crews were credited with saving at least five homes in addition to their around-the-clock emergency operation during the disastrous fires that ravaged 40,000 acres in the Malibu area Christmas week.

Many ingenious uses of company equipment and 200 men were chronicled during the fires. Among them was transforming insulator-washing rigs and tank trucks into fire-fighting apparatus and using company cars as mobile radio repeater stations.

Throughout the emergency, radio cars were shuttled from hilltop to hilltop to coordinate crews that were working on as many as half a dozen fire fronts at once. Company radio also was used to relay messages for county and U. S. Forest Service units.

By maintaining continuous communication between Edison field personnel and Culver and Saticoy substations, critically timed switching operations – sometimes executed in a matter of seconds – prevented major power interruptions.

When regular fire pumper trucks ran out of water, Edison tank trucks turned back the flames in time to save Latigo and Corral Canyon homes.

Major power interruptions were narrowly averted when flames raced within a few yards of Las Flores substation and completely encircled Zuma substation–both serving large numbers of residences and water pumps desperately needed for fighting the fire.

Edison lost 96 poles, 13 transformers and roughly five miles of 16-kv and 4-kv line, representing a fire damage of about $54,000.

Electrical service interruptions were kept at an amazing minimum, however, thanks to the dogged determination of linemen, ground crews, transportation, communications and substation personnel. Edison men, many of whom remained on duty continuously throughout the four-day fire, replaced burned-out poles and strung wire while the ground was still hot underfoot.

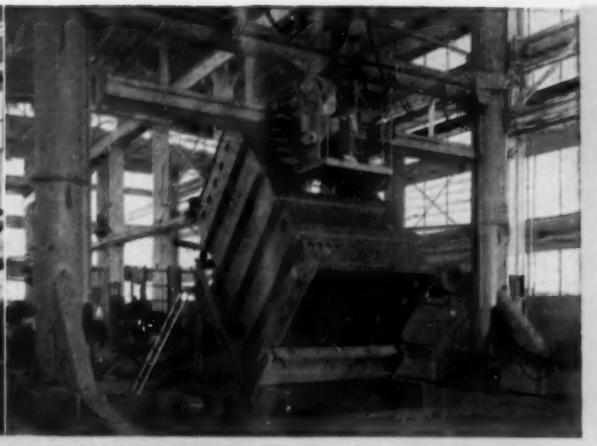
Their feat in following immediately in the wake of the fire to restore power for water pumps was lauded by Los Angeles County fire officials as well as scores of residents.

In addition to men regularly assigned to the Santa Monica distribution and supply headquarters, crews and equipment were rushed in from San Fernando, Santa Paula, Ventura, Inglewood, Redondo, Oxnard, Alhambra and the Coast Division.

The many crews and pieces of equipment were coordinated with fire fighting agencies by L. A. Smith, distribution superintendent of the company's Coast Division, and M. E. Croson, Edison's fire control assistant.

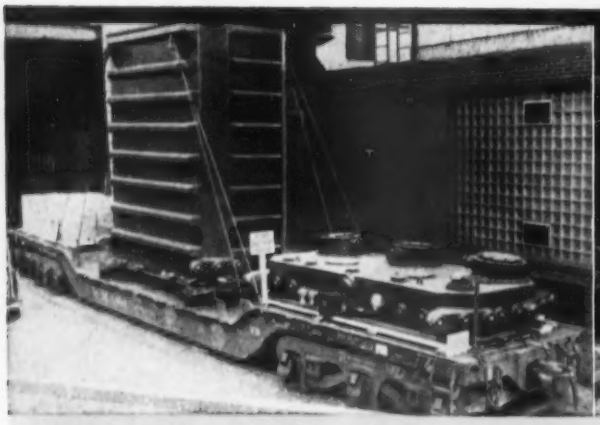
New facilities go in amidst devastation. Naylan Bender clears rubble away from the location of a replacement pole. Notice the two burned transformers in the foreground. The fire destroyed 96 poles and crews replaced them at times when the ground was still hot. Some men stayed on duty throughout the four-day fire. Besides poles, Edison lost 13 transformers and about five miles of power lines

ADVANCED ENGINEERING DESIGN . . . Wagner engineers, specialists in transformer design, have the skill and experience to design the best possible transformers today—and even better ones tomorrow. This knowledge is incorporated in every special transformer design and in Wagner standardized units as outlined in ASA Standards C57.12b.

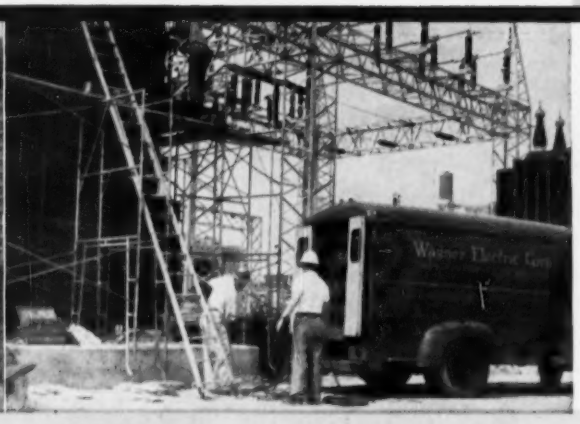


WELL CONSTRUCTED TANKS... Wagner builds all tanks for its transformers. Huge brake presses bend the steel plate smoothly. All seams are uniformly welded by the submerged arc method to insure continuous leak-proof welds that mean longer-lasting transformers.

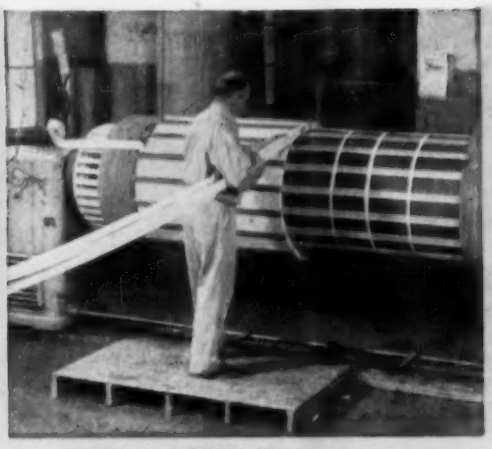
Quality is what you get in Wagner Power Transformers



SPECIALLY EXPEDITED SHIPPING... Railroad cars are brought right into Wagner's power transformer bay for loading. Main line railroads pass the Wagner plant for expedited shipments to all parts of the country.



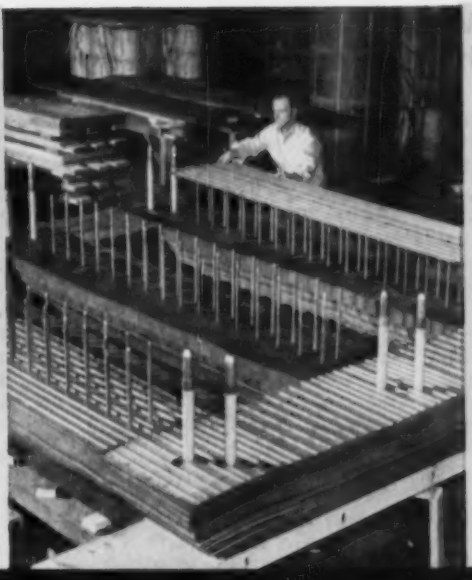
FIELD INSTALLATION SERVICE ... Wagner field service trucks, manned by trained service engineers, are available, at nominal cost, to help install new transformers, or to make repairs when necessary ... another reason why it pays to specify Wagner.



CAREFULLY WOUND COILS... Low voltage helical coils are continuously wound on insulating cylinders of high dielectric strength. High voltage coils are wound with buffer coils at each end for protection against any surges that might be encountered on a properly built transmission line or a substation.

EXACTINGLY BUILT CORES

The electrical steel sheets used for core laminations must meet the most rigid specifications. Laminations are annealed at carefully controlled temperatures to assure low core loss. Core laminations, with oil duct spacers, are individually stacked over insulated bolts.

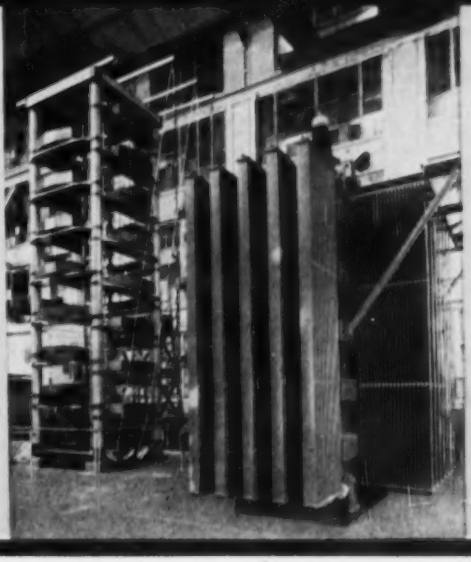


EXPERT ASSEMBLY

Core and coil assemblies are carefully insulated. All moisture and trapped air that might cause hot spots is removed in special vacuum tanks. Extreme care and skill is exercised in every assembly step.

RIGID INSPECTION AND TESTING

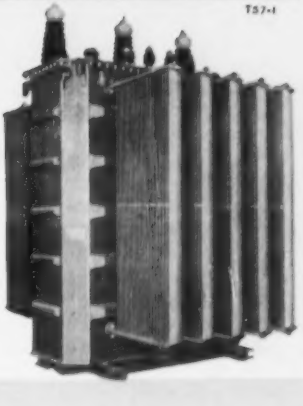
Wagner transformers are given all prescribed commercial tests ...and every new design is subjected to impulse tests to assure that the transformer will perform as designed.



T57-1

That's why it's to your advantage to specify Wagner

The extreme care given Wagner Power Transformers—from inception to installation—has one objective . . . to build the best possible transformers that will give you years of completely dependable service. Consult Wagner about your next power transformer installation. Thirty-two branch offices are at your service. Write for Wagner Bulletins TU-181 and TU-16D.



Wagner Electric Corporation
6381 Plymouth Ave., St. Louis 14, Mo., U. S. A.

Wagner Electric Corporation
SERVING INDUSTRY SINCE 1891

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

Washington Commission Hits Coal Supply Snag

Construction of a steam generating plant by the Washington State Power Commission might necessitate the state's entry into the coal-mining business.

Asked to quote a firm price on coal under a long-term contract, the Northwestern Improvement Co., owner of the principal mines in the Cle Elum-Roslyn area where the proposed plant would be built, countered with a proposal that the state buy his company's mining equipment and lease its property. The company then would operate the mines for the state.

Quoting a firm long-term price "when John L. Lewis raises our wage rates each year" would be impossible, said Earl R. McMillan, company manager. The commission wants a long-term price so it can figure its power costs.

The company, a subsidiary of the Northern Pacific Railway, mines about 2,000 tons a day.

First requisite for construction of the plant will be appropriation by the 1957 state legislature of $275,000 for engineering work.

The commisssion has received a report from Ford, Bacon & Davis, New York engineering firm, that the project would be feasible at interest rates up to 5%.

Wyoming Governor Wants Upper Colorado Power

Gov. Milward L. Simpson of Wyoming wants power generated from dams in the Upper Colorado River project to be allocated to the upper basin states.

That was to be one of the principal topics discussed in Cheyenne at a meeting of Simpson and governors-elect George D. Clyde of Utah, Stephen L. R. McNichols of Colorado and Edwin Mechem of New Mexico.

Simpson said unless the four upper basin states are allocated the power from the multidam project, preferential users in other areas may be allocated the bulk of the power, robbing the upper basin states of their opportunity for industrial expansion.

Simpson explained that under his plan, preferential users would have first right to the power which had been allocated to each basin state, but the power still would be reserved for development of Utah, Wyoming, New Mexico and Colorado.

"I want to combat the prospect that no power from Flaming Gorge Dam (just south of the Utah-Wyoming border) will be available for distribution in Wyoming," Simpson said. "We want to get our share of the power, not only the revenue from the power."

Report About Complete On Wells Site Project

Kaiser Aluminum & Chemical Corp. engineers are about to complete their report on feasibility of constructing a dam on the Columbia River at the Wells site north of Wenatchee, Wash., according to William Nordeen, manager of the Douglas County PUD at Bridgeport.

The report will be made to the PUD, potential builder of the dam, which would be between recently completed Chief Joseph Dam and the Rocky Reach Dam, now under preliminary construction by the Chelan County PUD.

Puget Sound Company Buys Electric System

Puget Sound Power & Light Co. has purchased the electric power system of the Northwestern Improvement Co. serving Roslyn, Cle Elum and Ronald, Wash., for an undisclosed amount. Bid of the Kittitas County PUD was rejected.

Northwestern operates several coal mines in the area. It will receive its power from Puget Power, under terms of the contract. Modernization of the system is planned.

Roslyn, Cle Elum and Ronald have combined populations of about 4,500.

Corps Survey Started On Lower Monumental

The Walla Walla District Corps of Engineers has begun preliminary surveys and exploration of possible sites for proposed Lower Monumental Dam on the Snake River in southeast Washington, 27 miles upstream from Ice Harbor Dam.

Lower Monumental would be the second in a series of four proposed dams on the river between Pasco, Wash., and Lewiston, Idaho. It would back water 27 miles to the site of proposed Little Goose Dam.

Lower Monumental, with an initial power installation of 240,000 kw, would cost an estimated $123,000,000. It also would provide irrigation, recreation and navigation benefits.

AUTHORIZED

FWD

SALES & SERVICE

ARIZONA: Phoenix
ARIZONA CEDAR RAPIDS CO.
1802-10 West Jackson
P. O. Box 6186
Telephone: Alpine 3-8205

CALIFORNIA: Los Angeles, 7
CALAVAR CORP.
2700 South Broadway
P. O. Box 77250
Telephone: Richmond 8-6292

San Francisco, 7
THE FWD PACIFIC CO.
850 Harrison Street
Telephone: Garfield 1-4971

COLORADO: Denver, 16
MACDONALD EQUIPMENT CO.
5300 Colorado Blvd.
Telephone: Amherst 6-2641

IDAHO: Boise
FEENAUGHTY MACHINERY CO.
600 Front Street
P. O. Box 639
Telephone: 2-4579

MONTANA: Helena
STEFFECK EQUIPMENT CO.
1825 North Main Street
P. O. Box 1154
Telephone: Hickory 2-4450

NEVADA:
THE FWD PACIFIC CO.
850 Harrison Street
San Francisco 7, Cal.
Telephone: Garfield 1-4971

CALAVAR CORP.
2700 South Broadway
P. O. Box 77250
Los Angeles 7, Calif.
Telephone: Richmond 8-6292

NEW MEXICO, KANSAS, OKLAHOMA, TEXAS:
UTILITY EQUIPMENT CO.
5305 North Santa Fe Avenue
P. O. Box 9507
Oklahoma City, Oklahoma
Telephone: JA 5-2136

OREGON: Portland, 14
FEENAUGHTY MACHINERY CO.
112 S. E. Belmont St.
Telephone: Belmont 2-2186

UTAH: Salt Lake City,
KIMBALL EQUIPMENT CO.
1846 South 2nd West
Telephone: Hunter 4-6109

WASHINGTON: Seattle, 4
FEENAUGHTY MACHINERY CO.
1028 6th Avenue, South
Telephone: Elliott 7808

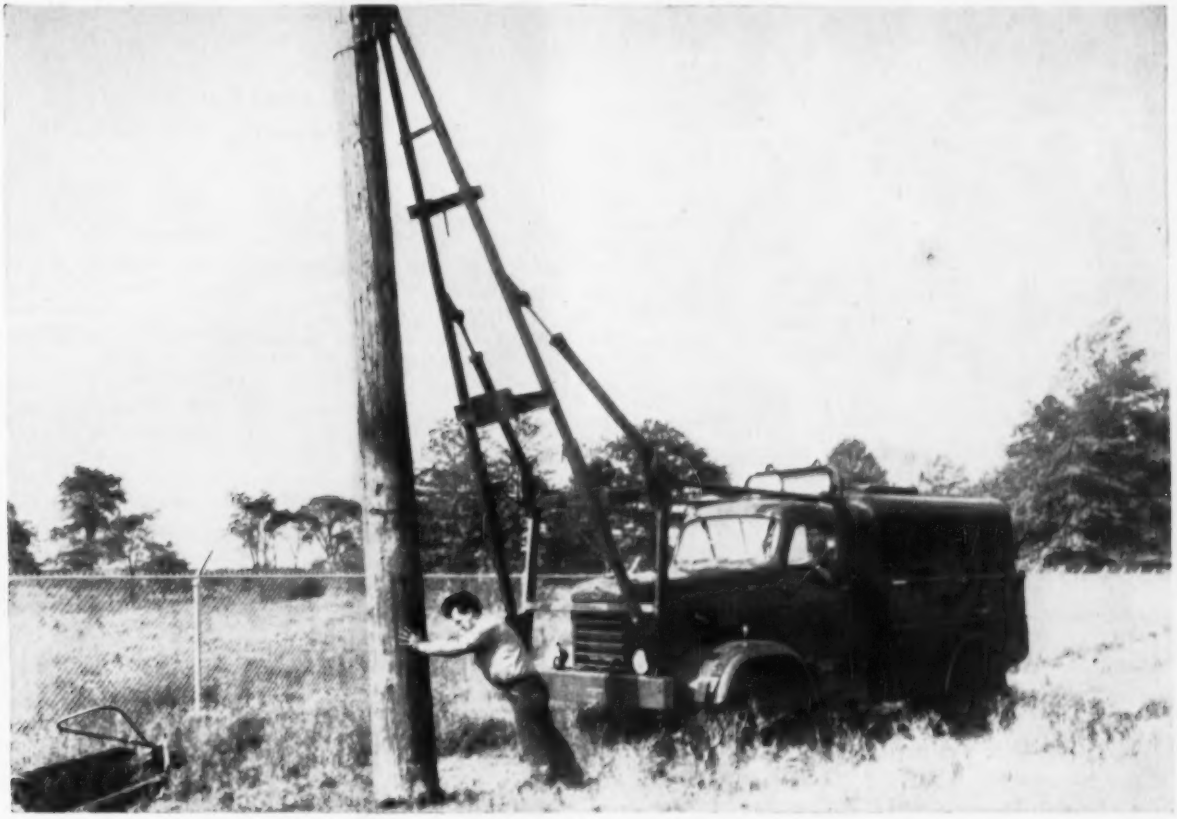
Spokane, 2
FEENAUGHTY MACHINERY CO.
No. 715 Division St.
Telephone: Fairfax 2514

WYOMING: Casper
STUDER TRACTOR & EQUIPMENT CO.
2300 East Yellowstone Highway
P. O. Box 779
Telephone: 2-5381

KIMBALL EQUIPMENT CO.
1846 South 2nd West
Salt Lake City, Utah
Telephone: Hunter 4-6109

TRAINED SERVICEMEN
GENUINE FWD PARTS

New FWD 2-Man "Rhino" Does 5-Man job in less time



HERE'S DEMONSTRATED PROOF: In the toughest kind of utility job tests, the new FWD "Rhino" has repeatedly proved it can dig more holes, set more poles . . . with fewer men!

The rugged-built "Rhino," with FWD's special power and weight proportioning, makes it practical to handle massive front-end loads . . . has the only *true* "full-time" four wheel drive. Equipped with a heavy-duty 9500 lbs. front axle, the "Rhino" carries front-mounted derrick and digger through the toughest kind of off-highway terrain.

The "Rhino" gives the driver full visual control at all times. No need to jockey back and forth. He just drives into position where the second man handles the digger or positions the pole. In any terrain, these two men will dig more holes, set more poles than five men . . . in less time!

FWD

Heavy-Duty Vehicle Specialists

THE FOUR WHEEL DRIVE AUTO COMPANY • **Clintonville, Wisconsin** • *Canadian Factory* • KITCHENER, ONTARIO

NOW..here's *new* convenience!
High Capacity
UNIT TEST BLOCKS

Write for BULLETIN 81

CAT. NO. 5612
Wire Cap. No. 6 to 1/0

CAT. NO. 5622
Wire Cap. No. 2 to 4/0

Test links interchangeable with service links, duplex screws on line side, solderless lugs with new type patented wire stop, barriers suitable for either side and extend ¼" over all live parts, large mounting holes in heavy duty moulded base.

All features that insure easier, quicker installation and trouble-free performance.

METER DEVICES COMPANY
1001 Prospect Ave., S. W.
CANTON 6, OHIO

INDIANA STEEL & WIRE CO. MUNCIE, IND.
Crapo Galvanizing

Signs along the lines of *Crapo* GALVANIZED STEEL STRAND PERFORMANCE

For dependable performance . . . insist upon *Crapo* Galvanized Steel Strand. Superior tensile strength, combined with long-life, ruggedness and workability, makes *Crapo* Steel Strand first choice for guys, messenger and overhead ground wire.

The famous *Crapo* galvanizing process provides dependable protection for the steel, prolongs the expectant life of the strand.

- Low maintenance cost
- Laboratory tested and controlled quality
- Meets highest quality standards
- A size and grade for all practical needs
- Contact your *Crapo* Jobber Today!

INDIANA
STEEL & WIRE CO., INC.
Muncie, Indiana

Petition Denial Action Gets Court Attention

The Washington State Supreme Court has ordered Secretary of State Earl Coe to explain in court why he rejected petitions supporting an initiative to outlaw high dams on the Cowlitz River and other streams tributary to the lower Columbia.

The order was obtained by the State Sportsmen's Council, which submitted petitions bearing a reported 85,000 names. Coe contended 90,319 signatures were required by a new state law which went into effect Dec. 6. The sportsmen asserted the old law, requiring only 50,000 signatures, applied because the initiative was begun before Dec. 6. They were unable to obtain 50,000 signatures before that date.

The proposed initiative, which would be presented to the 1957 state legislature, is aimed at blocking construction of Tacoma City Light dams on the Cowlitz River. Sportsmen declare the dams would be harmful to fishlife.

FPC Preliminary Permit Given to Skamania PUD

Skamania County, Wash., PUD No. 1 has been granted a 36-month preliminary permit to investigate feasibility of a proposed hydroelectric project on the Little White Salmon River, a minor tributary of the Columbia River.

The PUD, a small utility with headquarters at Stevenson in south central Washington, has indicated an earth-fill dam and storage reservoir, a diversion dam and a power house with two 10,000-kva generators could be built for about $4,000,000. Additional capacity could be added later.

The utility has indicated it plans to sell part of the generation to neighboring PUDs of Washington and Oregon or to the Northwest Power Pool.

SMUD and Georgetown PUD Agree on Use of Water

Sacramento Municipal Utility District believes it has removed a major obstacle blocking its proposed $85,000,000 Upper American River hydroelectric project.

SMUD has reached agreement with the Georgetown Divide Public Utility District on SMUD's proposed use of Rubicon-Loon Lake water for its big project. SMUD will make annual payments of $97,000 to Georgetown for 41 years in return for conveyance of Georgetown's water rights and physical facilities in the Upper Rubicon-Loon Lake area.

Georgetown expects to use the payments to build facilities on Pilot Creek for a bigger and more dependable water supply than is available from its present ditch system.

At the hearing before the Water Rights Board, Georgetown's attorney withdrew its protests to SMUD's power applications and its opposition generally to the Upper American River project.

Yellowtail Dam Project Opposed by Wyoming REA

The Wyoming Rural Electrification Assn. has gone on record opposing a partnership plan for Yellowtail Dam in southern Montana.

However, the association urged if a partnership plan between the federal government and private utilities is adopted that power be distributed under the preference clause.

The association also went on record to ask the 1957 Wyoming legislature to enact a new method of taxing electrical service companies "taking into consideration revenue per mile and density factors."

J. Harold Cash of Kaycee has been re-elected president of the Wyoming Rural Electrification Assn. and Emil Blom of Saratoga was named president of the Wyoming REA Managers Assn.

PP&L Makes Application For Lewis River Permit

License application for the Muddy project on the Lewis River has been filed by Pacific Power & Light Co. with the Federal Power Commission in a move to get the $34,000,000 project out of the planning stage. Third in the company's postwar hydroelectric projects on the southwestern Washington river, Muddy would have a rated generating capacity of 110,000 kw.

PP&L President Paul B. McKee reported the Muddy development is being undertaken within the agreement with Cowlitz County PUD dealing with joint development of the Lewis. McKee explained Cowlitz has an option to take over construction of the Muddy project at any time up to a year after FPC licensing.

Muddy would rise at the head of the reservoir impounded by Swift Dam, now under construction.

MIKE THE MOLE SAYS: *Give the GUY a CHANCE*

there's a CHANCE ANCHOR for every guying need

8-WAY EXPANDING

The guy load is distributed all around the anchor—no wasted space between blades. Usually installed in clay or loam.

NEVER-CREEP

Made of structural steel. Pulls *entirely* against solid, undisturbed earth. For extra heavy loads in clay or loam.

NO-WRENCH SCREW

For hand or machine installation. Pitch-controlled blade goes down faster and adds to holding power in sandy soil, soft clay or loam.

CROSS-PLATE

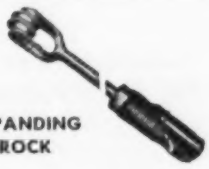
For heavy-duty anchoring in machine-bored holes. Holds better than logs or slugs. Saves time and money.

SWAMP SCREW

For swamps, marshes, quicksand, river crossings or seasonally flooded areas. Screws down deeply by adding sections of pipe.

8-WAY CONE

Acts as inverted wedge. Flaring base and flat faces increase wedging action. Used in rocky areas with rock wedging.

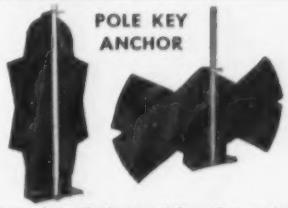


EXPANDING ROCK

No grouting necessary. The greater the pull, the tighter it wedges against solid rock. Set in 2" drilled hole.

WRENCH TYPE SCREW

All steel—double arc welded. Anchor hub absorbs installation strain. For light loads in sandy soil, soft clay or loam.



POLE KEY ANCHOR

Keys poles at the butt to reinforce them against unbalanced loads in soft soil. Ideal for congested urban areas.

Both the soil type and condition are important factors in determining the type of installation and the kind of anchors to use. That's why Chance Anchors are made in so many types and sizes. The anchors shown above are made in a wide variety of sizes. Each type is designed for certain soil and guying conditions. Each of these anchors will do its specific job better than any other anchor you can choose.

Protect your investment in line construction. Analyze your soil and guying conditions, and specify the Chance Anchors that meet your particular requirements.

There is a CHANCE Anchor Distributor in your area who can probably fill your order directly from stock.

Specify CHANCE for Service!

A·B·CHANCE CO·

CENTRALIA, MISSOURI

ABC INDUSTRIES

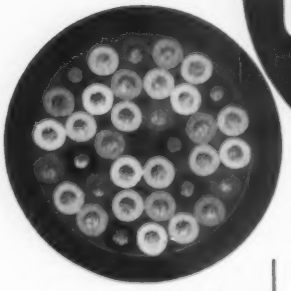
CA56-19

EARL S. Condon COMPANY
Engineering Representatives

- Burndy Engineering Co.
- Carma Manufacturing Co.
- Cole Electric Co.
- Lapp Insulator Co.
- P-W Industries, Inc.
- Preformed Line Prod. Co.
- Southern Car & Mfg. Co.
- United States Rubber Co. Wire & Cable Division

3460 WILSHIRE BLVD. • LOS ANGELES 5, CALIF.
DU 1-3951 • TWX: LA-795

NOW!



BRONCO 66 CERTIFIED CONTROL CABLES

WITH UP TO 36 CONDUCTORS

BRONCO 66 CERTIFIED CONTROL CABLES are made with the tough, flexible, oil-resistant, Synchro-Cured Bronco 66 jacket that is certified to contain not less than 67.32% Neoprene. Jacket is branded every two feet.

There are three types of Bronco 66 Certified Control Cable – extra flexible portable cable, shielded portable control cable for electronic circuits, and "stationary" for important control circuits. In the stationary type there is a color-coded Neoprene jacket over each single buna-rubber insulated conductor.

write for

NEW FREE CATALOG CONTAINING A COMPLETE LISTING OF BRONCO 66 CERTIFIED CABLES:

WESTERN INSULATED WIRE CO.
Los Angeles 58, California
Please send me your new free catalog of wires and cables.

Name _____ Title _____
Company _____
Address _____

WESTERN INSULATED WIRE CO.
Los Angeles 58, California

Gorge High Dam Plans Give Bonus Kilowatts

Construction of the Gorge high dam and improvements at the Gorge power house for Seattle City Light will increase the capacity of the plant 10,000 kw beyond the 47,000 kw originally estimated, Supt. Paul J. Raver has revealed.

The original estimate was based on the 88-ft higher head to be created by the new dam, now under construction, and changing the turbine runners of the four generating units in the 108,000-kw plant to take advantage of the higher head. Cooperative studies between City Light and turbine manufacturers have shown that additional hydraulic improvements in the power house will result in the higher capacity, Raver said.

The additional 57,000 kw are expected to be available in early 1959. All except approximately 20,000 kw probably will be earmarked for two electric steel furnaces to be installed at the Seattle plant of the Bethlehem Pacific Coast Steel Corp.

Upper Colorado Project May Get More 1957 Money

Budget needs for the Upper Colorado Storage Project will be reviewed by the Department of the Interior with the possible outcome of adding another $10,000,000 to the anticipated $25,000,000 request in President Eisenhower's budget.

The Interior Department's recommendations will provide the basis for the President's budget request.

Bureau of Reclamation officials have said they will need $35,000,000 for the fiscal year beginning July 1.

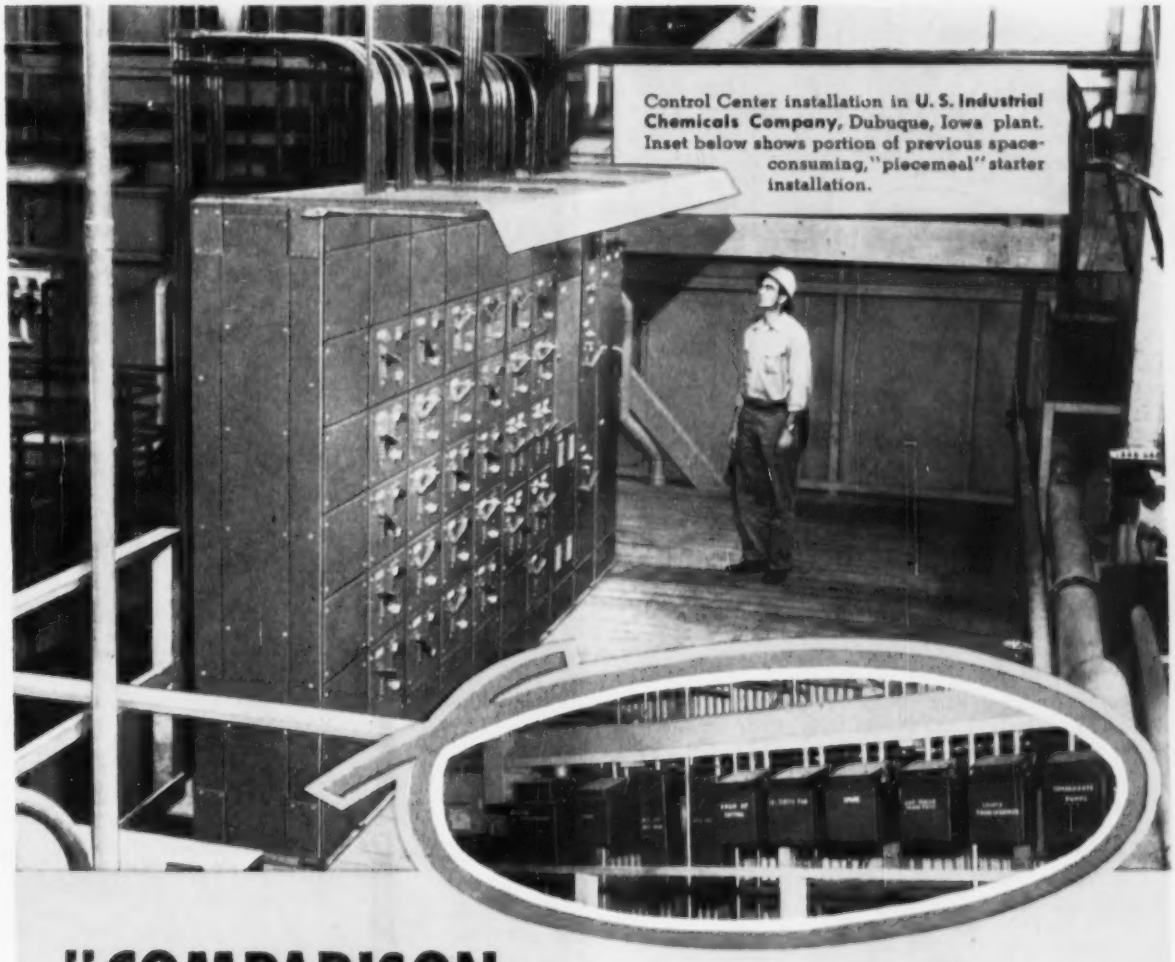
Copco Gets License For Big Bend Project

California Oregon Power Co. has been granted a license for construction of its Big Bend hydroelectric project on the Klamath River by the Oregon Hydroelectric Commission.

The license requires that facilities for fish protection be constructed on the basis of a study to be undertaken by the Oregon Fish Commission.

The power house will have two 40,000-kw generating units.

• **Vancouver Architects** Townley & Matheson have plans in the working drawings stage for $1,000,000 extension to an existing building in Vancouver occupied by the staffs of British Columbia Electric Co.



Control Center installation in **U. S. Industrial Chemicals Company,** Dubuque, Iowa plant. Inset below shows portion of previous space-consuming, "piecemeal" starter installation.

"COMPARISON convinced us that a SQUARE D Control Center offered us MORE!"

These design features make Square D <u>your</u> logical choice, too...

INCREASED SAFETY because bus bars are fully enclosed, rigidly supported and have ample cross section. Circuits are isolated by individually enclosed plug-in units. Disconnect handle designed for maximum operator protection.

FLEXIBILITY. Individual plug-in units or complete sections are easily added, removed or exchanged. Pushbuttons, pilot lights, and selector switches are readily added to unit doors.

INSTALLATION ECONOMY. All wiring channels are large and accessible from front without removing units. No "wire fishing."

SPACE ECONOMY, TOO. Up to six combination starters fit in a 20" x 20" x 90" section. Plug-in unit heights designed in space-saving increments of 3 inches.

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE!

SQUARE D COMPANY

read all about it!
HOLAN
ALL-HYDRAULIC LADDER
The last word in ladders. Every movement of Holan's 2100 Ladder is controlled hydraulically. It rotates 360° . . . reaches up to 40 feet in the air . . . elevates to a 75° elevation.
Write for the new 2100 catalog for technical information
J.H. HOLAN CORPORATION
4100 WEST 150th STREET
CLEVELAND 11, OHIO
OTHER PLANTS: GRIFFIN, GA.; PHOENIX, ARIZONA; BRANTFORD, ONTARIO
To: J. H. Holan Corporation
4100 West 150th Street
Cleveland 11, Ohio
Please send me the factual technical bulletin about Holan's 2100 Hydraulic Ladder.
Name Title
Address
City Zone State

Cowlitz Work Slowing To Await Court Ruling

Less than 100 workers are on the job at Tacoma City Light's Cowlitz River project as a decision is awaited in a case now before the Washington Supreme Court.

General contract work on Mayfield Dam, the first phase of the project, has been reduced to excavation for a tunnel and removal of rock on the cliffs.

Bids and Contracts

• **General Electric Co.** has received a $9,600,000 contract to furnish and install six 82,105-kva main generators for The Dalles power house.

• **S. Morgan Smith Co.** will supply a turbine unit and 13 valves for the Kings River and Upper Feather River projects of Pacific Gas and Electric Co. The total value of the equipment runs well over $1,250,000, the company reports.

• **Bid calls** for construction of the $700,000 Ketchikan Lakes hydroelectric project of the city of Ketchikan, Alaska, will be issued in February.

• **Harnischfeger Corp.**, Seattle, has received a Corps of Engineers contract to supply a 35-ton mobile crane for use at The Dalles Dam.

• **Olson Electric Co.**, Vancouver, Wash., was low bidder at $10,942 for modification of the outdoor portion of the Corps of Engineers' 15-kv insulated bus duct at Lookout Point power house.

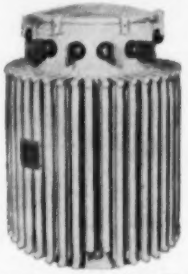
• **Knisely-Moore Construction Co.**, Douglas, Wyo., will build the access road from Alcova Dam in central Wyoming to the Fremont Canyon plant site on the North Platte River for the Bureau of Reclamation. Contract is for $479,352.

• **S. Morgan Smith Co.** will furnish seven hydraulic turbines and oil pressure governors for $11,660,975, and Todd Shipyards Corp. 12 spillway gates and accessories for $3,029,112 to the Rocky Reach project of Chelan County PUD of Wenatchee, Wash.

• **General Electric Co.** is low bidder for manufacture and installation of six 83,105-kva generators by the Corps of Engineers for The Dalles project. Bid was $9,870,993.

• **Newport News Shipbuilding & Drydock Co.**, Newport News, Va., has been awarded a $608,750 con-

MEET THE NEW
167 KVA
Featherweight
PENNSYLVANIA
POLE STAR
DISTRIBUTION TRANSFORMER



★ Will replace any single phase 75 or 100 Kva Pole-mounted Transformer to provide 67% to 123% more capacity.
★ Weighs less than 1500 pounds.
★ Lower in overall height than average 100 Kva transformer.
★ Available in standard voltages up through 13,200 volts.
★ The FIRST 167 Kva transformer made for direct pole mounting.

For further information, contact
J. G. CORRIN
510 West 6th Street, Los Angeles
VAndike 0830
GEO. E. HONN CO.
420 Market Street, San Francisco
SUtter 1-7352

FRANCHISED REPRESENTATIVE OR DEALER

with established contacts in the heating, piping and electrical contracting business. No investments—we finance. Excellent opportunity for experienced hard-working man to sell nationally known pipe bending equipment. Plenty of good leads with assistance furnished backed by strong trade advertising. High discounts. Send resume with financial and trade background to Tal Bending Equipment, Inc., 417 N. Water St., Milwaukee 2, Wis.

in the Electrical West . . .

THE NEXT FIVE YEARS GROWTH WILL EQUAL LAST 10!

Your sales will expand in the growing West if you advertise in

ELECTRICAL WEST
68 Post St., San Francisco 1, Calif.

tract to install two hydroelectric turbines in the Fremont Canyon power plant in central Wyoming, a Bureau of Reclamation project.

• **Contracts** for construction of the second part of Washington Water Power's service facility have been let to: **Busboom & Rauh**, general contract, $2,228,669; **Warren, Little & Lund** and **James Smythe Plumbing & Heating Co.**, mechanical work, $794,668; **Power City Electric Co.**, electric work, $486,463.

• **Fishback & Moore** will reroute the Corps of Engineers Rock Island-Renton 110-kv power line for $89,750.

• **Pratt Electric Supply** Co. has a contract to supply Seattle City Light with incandescent and mercury vapor street lighting lamps in 1957.

• **Northern Construction** Co. and **J. W. Stewart** Ltd. have a contract to bore a 2½-mile tunnel for British Columbia Electric Co. The $9,000,000 contract is one of the two largest to be awarded in connection with B. C. Electric's Bridge River hydroelectric project. **Vancouver Iron Works** has the contract to supply steel plate for penstocks and tunnel lining, which amounts to $1,250,000.

• **Fluor** Corp. has contracts for engineering work on two substations for Southern California Edison Co. A new installation is to be at Puente and will cost about $425,000; the other work is on an existing substation near Norwalk.

Bonneville Awards

Bonneville Power Administration has announced the following contract awards:

Tobe Deutschmann Corp., Norwood, Mass., $36,028, for capacitor units on bid invitation 8182;

Witzig Electric Co., Corvallis, Ore., $24,793, for construction of Grandview substation additions:

Reynolds Metals Co., Louisville, Ky., $83,666, for aluminum conductor and accessories on bid invitation 8149;

George S. Smith, Bothell, Wash., $13,179, for construction of bank No. 2 additions to Milton substation;

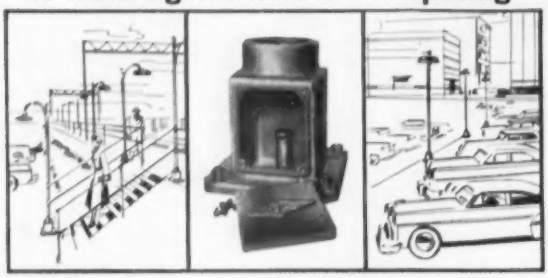
J. Neils Lumber Co., Libby, Mont., $14,232, for poles on bid invitation 8167;

Creamer & Dunlap Inc., Tulsa, Okla., $74,606, for tower steel on bid invitation 8200;

Portland Electric & Plumbing Co., $77,001, for cable wire and conductor on bid invitation 8196.

IT PAYS TO HAVE
HUBBELL
GOOD CONNECTIONS
for greater plant
safety and security
REPLACE NOW
WITH SUPER
Twist-Lock
featuring Screwless
Pressure-Grip Terminals and Dead Front
2 PC.
DEAD FRONT CAP
For Greater Safety
Dead front completely encloses cap, keeps out foreign particles that might short-circuit contacts. No need for fibre insulating disc, therefore no extra parts to lose or forget to use.
TERMINALS ARE
LOCKED IN
Terminals are pressure-gripped in place, can't pull out. Conductors are confined in their individual pockets, can't spread. No danger of flash over. Design assures greater wiring uniformity.
GREATER BLADE RIGIDITY
For Greater Strength
Stronger, rigidly supported contacts withstand hard knocks, retain uniform alignment and maintain polarity.
HEAVIER ARMOUR
BUT MORE COMPACT
For Longer Life,
Safer Performance
Rugged protective steel shell protects inner construction, resists the roughest industrial usage.
IMPROVED CORD GRIPS
RELIEVE STRAIN
FROM CONTACTS
Powerful cord grip design provides pull-proof pressure grip on cable.
SCREWLESS TERMINALS
SPEED WIRING...
CUT COSTS
No awkward binding posts. 2-pc. cap and connector body can be wired in ½rd the time, thus reducing installation costs.
Interchangeable with Regular Twist-Lock units of equal rating.
Folder tells the complete story. Write today.
HARVEY
HUBBELL, INC.
HIGHEST QUALITY
WIRING DEVICES • MACHINE SCREWS
WIRING DEVICE
WAREHOUSE LOCATIONS
ASSURE NATIONWIDE
STOCK AVAILABILITY
Bridgeport 2, Connecticut
State and Bostwick Streets
Chicago 7, Illinois
37 South Sangamon Street
Los Angeles 12, California
103 North Santa Fe Avenue
San Francisco, California
1675 Hudson Avenue
Dallas 7, Texas
1111 Dragon Street
DEPT. B-1 BRIDGEPORT 2, CONNECTICUT

A rigid support for cut-to-length pipe
A watertight chamber for splicing



COMBINED IN THE NEW HOPE METAL-PIPE BASE for your outdoor lighting jobs! Cut Standard pipe to length—thread it to fit the Hope Metal-Pipe Base and to take the lighting fixture—and you have a complete custom-made, low-cost lighting standard. Buy the components through your electrical wholesaler—assemble them yourself—install the standards for signs, signals, platforms and plant lighting jobs. Bases made for 2", 2½", 3" and 4" pipe sizes. See your wholesaler —or write us direct.

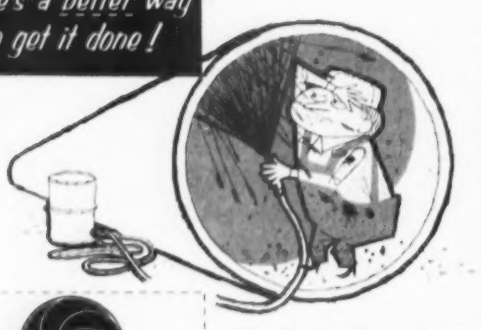
2" — H 42200
2½" — H 42250
3" — H 42300
4" — H 42400

HOPE

AVAILABLE WITH RECEPTACLE
•
BULLETIN #25

HOPE ELECTRICAL PRODUCTS CO.
57 Long Avenue, Hillside, N. J. Elizabeth 4-7837

there's a better way to get it done!



Coal tar lining is applied uniformly by centrifugal process

Provides mirror-like surface with a tight bond

Centrifugal spinning of coal tar lining to large diameter pipes, penstocks, and discharge lines, can now be done quickly, efficiently, and economically by specially designed equipment. Expert crews and complete mobile equipment available to serve you.

Write for full information TODAY!

For Dependable Pipe Line Service Call in the Specialists!

Specializing in Pipe Protection Problems
• Tate and Centriline "In Place" Interior Cement Mortar Lining • "In Plant" and "Railhead" Centrifugal Spinning of Cement Mortar or Coal Tar Linings—Somastic® Exterior Coating • Pipe Wrapping • Reclamation: Removal of Old Wrapping, Straightening, Blasting, Beveling, Testing.

PIPE LININGS Inc.
2414 East 223 St. (P.O. Box 457)
Wilmington, California

NEWS ABOUT PEOPLE

• **Wilbert G. Metzler**, a detective on the Denver police force, has been appointed chief security officer for Public Service Co. of Colorado. He succeeds **George Woods**, who resigned after 25 years to become chief of the Englewood fire department.

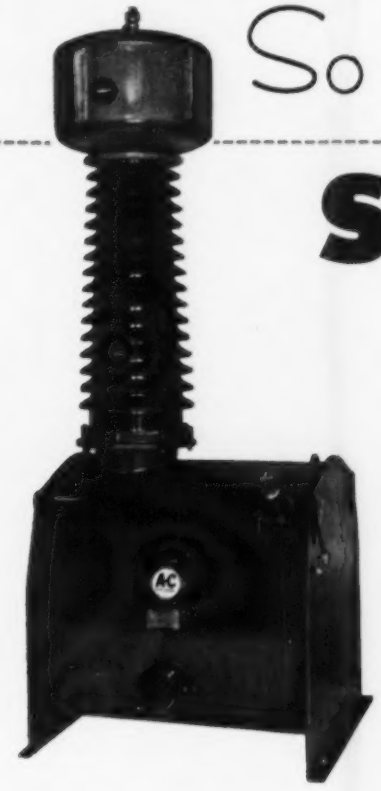
• **Aaron B. Cayo**, superintendent of the distribution department for Portland General Electric Co., has retired after 45 years of company service.

• **Otis L. Pemberton** is new manager of the Orange County District of San Diego Gas & Electric Co. He succeeds P. H. Adams, who resigned. Pemberton has been with the company 21 years in successive positions in the customer extension department.

• **Retirement** of A. O. Mangold from the engineering staff of Pacific Power & Light Co., closed 42 years of service to improvement of utility service to consumers of the Portland area. Mangold is an electrical engineering graduate of Oregon State college and started his career with Northwestern Electric Co., which later became part of PP&L.

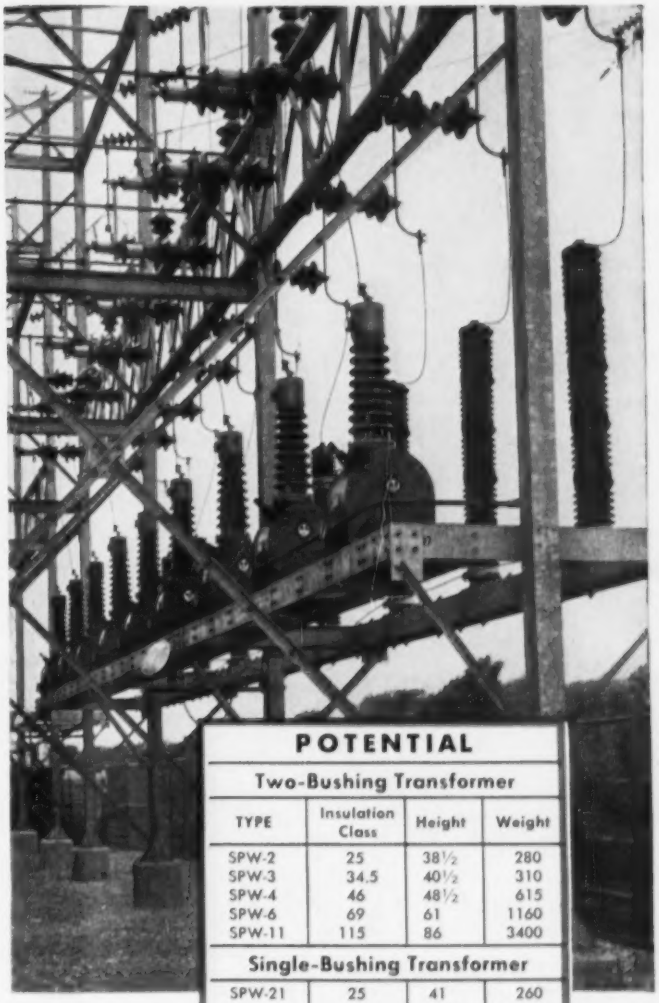
Stillwell

• **James F. Stillwell** Jr. has joined Reynolds Metals Co. as an industrial sales representative in the Puget Sound area and Yakima. He was formerly with the Seattle branch of Clingan & Fortier, distributor of Reynolds industrial materials.



So Light...SO COMPACT

So *Easy* to Install



MUCH smaller and lighter than previous designs, new Allis-Chalmers potential transformers cut installation costs and provide maximum handling convenience. Less space and less foundation to mounting structure are required. A fork truck or block and tackle is all that is needed to lift these 69-kv units into position. And, of course, relocating is accomplished just as easily.

Performance has also been improved in both ratio and phase angle with the advanced design of Allis-Chalmers potential transformers.

Many other design features — features that assure unparalleled dependability and long life — have been incorporated in these modern units. Get the complete story from your local A-C representative or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

POTENTIAL

TYPE	Insulation Class	Height	Weight
Two-Bushing Transformer			
SPW-2	25	38½	280
SPW-3	34.5	40½	310
SPW-4	46	48½	615
SPW-6	69	61	1160
SPW-11	115	86	3400
Single-Bushing Transformer			
SPW-21	25	41	260
SPW-31	34.5	44¼	285
SPW-41	46	50¾	460
SPW-61	69	63¾	950
SPW-111	115	92	2310
SPW-131	138	112	3510

NATIONAL ELECTRICAL WEEK FEB. 10-16, 1957

New Ratings have been added to the Allis-Chalmers line of potential transformers to include higher voltage insulation classes.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

A-5164

MAYDWELL & HARTZELL
INCORPORATED

Engineering Sales Representatives

ELECTRICAL
transmission, distribution, communication
EQUIPMENT

•

Sales Offices and Warehouses

870 TENNESSEE STREET
SAN FRANCISCO 7
ATwater 8-6900

427 W. FIFTH STREET
LOS ANGELES 13
MUtual 7245

306 DEXTER AVENUE
SEATTLE 9
SEneca 2368

324 S. SECOND AVE.
PHOENIX, ARIZONA
ALpine 3-9595

121 S. MONROE STREET
SPOKANE 8
MAin 4-4326

2318 N.W. VAUGHN STREET
PORTLAND 10
CApitol 8-4173

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

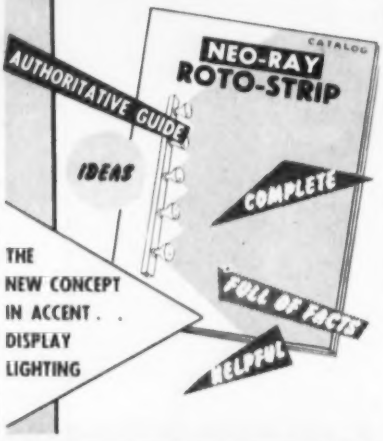
EVERSTICK ANCHORS

For new construction and maintenance —Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resilient, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

One Fixture Cost . . One Installation Cost
NEO-RAY
ROTO-STRIP
C.S.A. APPROVED Pat. Pend.

HIGHER PROFITS FOR YOU



California • Nevada
Robert J. Arthur
420 Market St.
San Francisco 11, Calif.

Washington • Oregon
Neil Winikoff
7554 44th N.E.
Seattle 5, Wash.

Mfrd. by: NEO-RAY PRODUCTS, INC.
315 E. 22nd St., New York 10, N. Y.

Knerr

• **Lewis R. Knerr** is new manager of rates and valuation for San Diego Gas & Electric Co. It is a new position set up to coordinate activities of the separate departments. He was formerly a public utility consulting engineer with offices in Oakland.

• **H. P. Dayton,** vice-president and director of the Sierra Pacific Power Co., retired effective Jan. 1, following a career in public utilities that had lasted for nearly 43 years. The past 34 years had been spent with Sierra Pacific at its offices in Reno.

• **Oregon Public Utilities** Commissioner Charles H. Heltzel, who has served under three Republican governors as head of the state's regulatory agency, resigned Jan. 14 to resume his law practice in Salem.

• **Hal W. Birkeland,** head civil engineer for Tacoma City Light's Cowlitz River hydroelectric development, has resigned to become a partner in the consulting engineering firm of Anderson & Anderson at Tacoma.

Deaths

• **S. W. Andrews,** 66, a director of Fluor Corp. and president of H. G. Acres & Co., a Fluor affiliate, died Dec. 31.

• **Edwin A. Woodhead,** 69, chief consulting engineer for Idaho Power Co., died Jan. 3 in Salt Lake City en route to his Boise home from California. He was the oldest employee of Idaho Power from the standpoint of service. He joined a predecessor company as a lineman in 1906, and was in power plant work for the past 42 years.

Greater current-carrying capacity of Type AB butyl high-voltage cable helps users cut costs, use new or existing facilities more efficiently.

Cable that takes the squeeze out of crowded conduits

Now you can obtain the same amount of current with a smaller cable . . . or more current with the same size cable — with Anaconda's Type AB butyl high-voltage insulation.

For Anaconda Type AB butyl-insulated cable is recommended for operation at 90C operating temperature up to 5kv, and 85C at 5001 volts and up. Industry specifications recommend 70C for oil-base insulations. Thus, Type AB delivers more current-carrying capacity . . . more amps per dollar.

NEW ENGINEERING BULLETIN

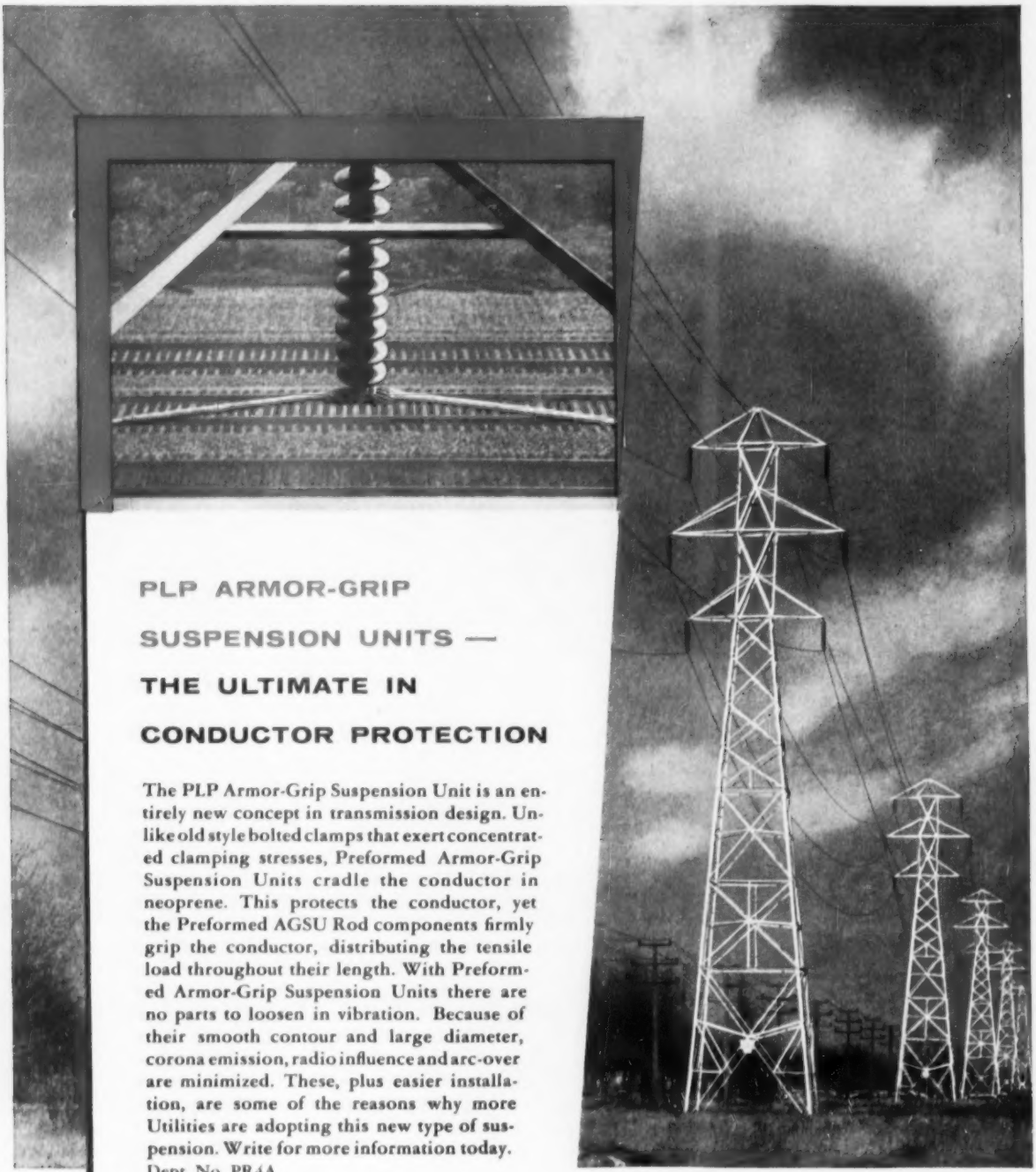
Bulletin EB-27 gives you full details on performance on Type AB insulation in 15 Industry Specification Tests. Ask the Man from Anaconda for your copy. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

S6206 Rev. (3)

SEE THE MAN FROM ANACONDA®

—pioneer in BUTYL INSULATION

FASTEST WESTERN SERVICE — At Orange, California, Anaconda's expanded, modernized mill fabricates and stocks copper and aluminum wire and cable for *every type of application*. Anaconda's Western Distributors thus can assure the fastest possible service on all West Coast needs. See Anaconda Sales Offices: Los Angeles, San Francisco, Seattle, Denver.



PLP ARMOR-GRIP SUSPENSION UNITS — THE ULTIMATE IN CONDUCTOR PROTECTION

The PLP Armor-Grip Suspension Unit is an entirely new concept in transmission design. Unlike old style bolted clamps that exert concentrated clamping stresses, Preformed Armor-Grip Suspension Units cradle the conductor in neoprene. This protects the conductor, yet the Preformed AGSU Rod components firmly grip the conductor, distributing the tensile load throughout their length. With Preformed Armor-Grip Suspension Units there are no parts to loosen in vibration. Because of their smooth contour and large diameter, corona emission, radio influence and arc-over are minimized. These, plus easier installation, are some of the reasons why more Utilities are adopting this new type of suspension. Write for more information today.
Dept. No. PR4A

PX-79

PLP Armor-Grip Suspension Units support these 132 KV Cleveland Electric Illuminating Company lines.

PREFORMED LINE PRODUCTS CO.

5349 ST. CLAIR AVENUE • CLEVELAND 3, OHIO

Telephone: Cleveland EXpress 1-3571

Made in accordance with or for use under one or more of the following U. S. Patents: 2,722,393; 2,275,019; 2,587,521; 2,609,653; 2,691,865; other patents pending.

possible service on all West Coast needs. See Anaconda Sales Offices: Los Angeles, San Francisco, Seattle, Denver.

NOTES ON THE TRADE

Essix Breaks Ground For Warehouse, Office

Ground-breaking ceremonies were held Jan. 10 for a $250,000 sales and distribution office and warehouse for Essex Wire Corp. in the new South San Francisco Industrial Park.

Located on a two-acre site, the structure will be a one-story reinforced concrete building containing more than 22,000 sq ft. It is the first building to be constructed by Utah Construction Co. and Haas & Haynie in the multimillion dollar industrial subdivision.

Essex Wire, with its headquarters in Fort Wayne, Ind., has offices in San Francisco and California plants at Anaheim and San Diego.

Wire and Cable Business Sold to Kaiser Aluminum

Kaiser Aluminum & Chemical Corp. has announced purchase of the wire and cable business of the United States Rubber Co.

The purchase, for an undisclosed amount in cash, was effective Feb. 1 and includes U. S. Rubber's insulated wire and cable plant at Bristol, R. I., and its wire and cable inventories, according to the announcement made by D. A. Rhoades, Kaiser Aluminum vice-president and general manager.

In addition, Kaiser Aluminum takes over U. S. Rubber's nationwide wire and cable sales organization and network of distributors as well as all Bristol plant personnel. The corporation plans to continue service without interruption to existing customers and maintain the same channels of distribution.

• **A. L. Peake** has been appointed assistant manager of Kaiser Steel's central district sales office in Oakland to succeed **Mark Anthony**, recently named assistant to the vice-president and general manager of Kaiser Steel. Peake moves from Los Angeles where he was in the southern district sales office.

• **Conrad Creim** Co., Seattle, is now franchise representative for sales and service of Yale industrial lift trucks. Service facilities maintained by the company include two mobile units.

• **Williams, Gritton & Wilde**, Salt Lake City, is new representative of the Westinghouse Sturtevant Division in Utah, southern Idaho, eastern Nevada and western Wyoming. The new representative is a well-established, well-known heating and ventilating consulting and design engineering firm.

• **Ralph B. Black**, Albuquerque, has been appointed sales agent of Pittsburgh Standard rigid steel conduit in New Mexico and the El Paso area.

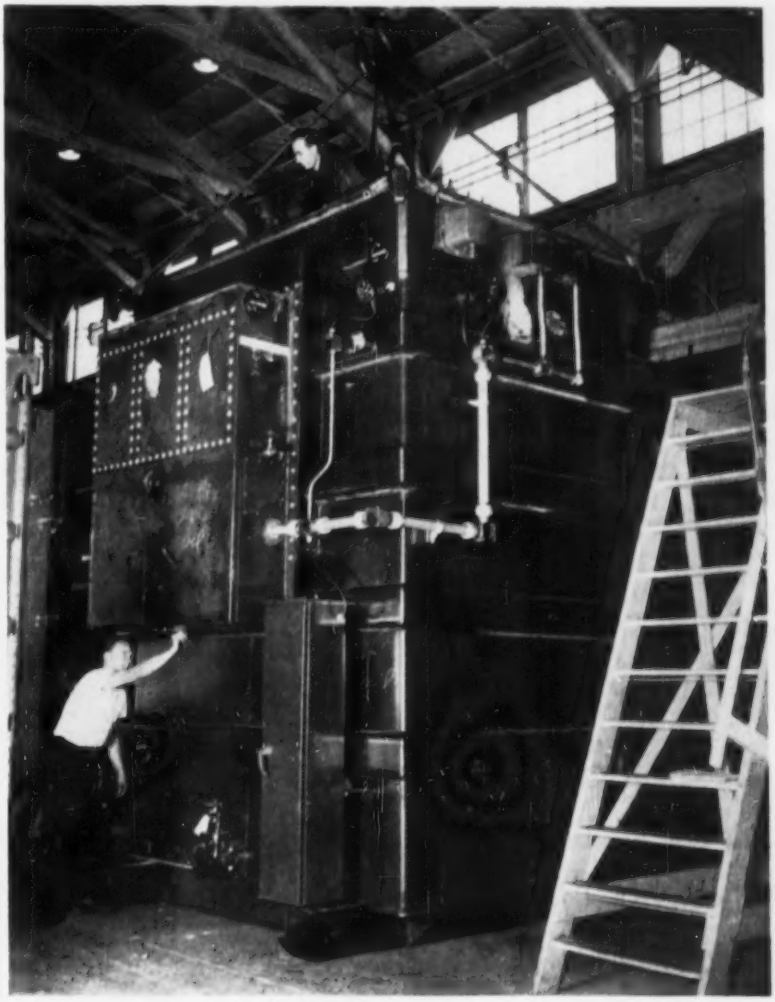
• **Rollin J. Kennard**, chief engineer of mechanical and electrical departments of the Anaconda Co. Western properties, retired Jan. 1. His successor is **Carl J. Lundborg**, mechanical superintendent at Columbia Falls, Mont.

• **C. Dean Ramsden** has been appointed vice-president and general manager of Pacific Coast Engineering Co., Alameda, Calif.

• **Fred G. Brear** is appointed successor to Kaiser Steel's A. L. Peake in the position of assistant sales manager of the southern district sales office in Los Angeles.

• **Electric Sales** Co., Los Angeles, and A. J. Nelson Co., Denver and Albuquerque, are among new manufacturers' representatives appointed by Keystone Mfg. Co.

• **New address** of G&W Electric Specialty Co. is 3500 W. 127th St., Blue Island, Ill. The company has a new plant with increased production facilities.



Weighing more than 112,000 lb, this transformer is the largest ever built by Westinghouse at its Sunnyvale plant. It is one of two destined for service in the San Diego Gas & Electric Co. system. A special feature is that it automatically maintains a constant outgoing voltage, insuring better efficiency for home appliances and other devices. Fully assembled, the transformer stands 19 ft high, 15 ft wide

INDEX TO ADVERTISERS

February 1957

Advance Transformer Co. 23
Allis-Chalmers Mfg. Co. 6, 7, 13, 39, 165
Amco Plastic Pipe Co. 138
American Steel & Wire Div. U.S. Steel Corp. 46, 47
American Tel. & Tel. Co. 29
Anaconda Wire & Cable Co. 167
Anderson Electric Corp. 49
Appleton Electric Co. 37
Atomics International 53

Baldwin-Lima-Hamilton Corp. 58
Barth Corp. 22
Blackburn Corp., Jasper 43
Brewer-Titchener Corp. 30, 31
Briegel Method Tool Co. 77
BullDog Electric Products Co. 141
Burndy Corp. 152

Carol Cable Co., Div., Crescent Co., Inc. 9
Chance Co., A. B. 159
Circle F Mfg. Co. 42
Classified 162
Condon Co., Earl S. 160
Copperweld Steel Co. 62
Corrin, J. G. 162
Crouse-Hinds Co. 139

Davey Tree Surgery 22
Day Brite Lighting, Inc. 44
Delta Star Electric Div., H. K. Porter Co. Inc. 52
Driver-Harris Co. 45

Electro-Motive Div. General Motors Corp. 40, 41
Everstick Anchor Co. 166

Fanner Mfg. Co. 144
Federal Pacific Electric Co. 146, 147
Fisher-Pierce Co. Inc. 56
Fluor Engineers & Constructors 88
Four Wheel Drive Auto Co. 156, 157

Godney Electric Co. 27
General Cable Corp. 19
General Electric Co.: Cleveland, Lamp Div. 131
Schenectady, Apparatus Div. 10, 54, 55, 73, 74, 75, 76, 92
Globe Lighting Products, Inc. 133
Graybar Electric Co. 48

Holan Corp., J. H. 162
Holophane Co. Inc. 63
Honn Co., George E. 162
Hope Electrical Products, Inc. 164
Hotpoint Co., Div. G.E. Co. 32
Hubbard & Co. 79
Hubbell, Inc., Harvey 163

Indiana Steel & Wire Co. Inc. 158
I-T-E Circuit Breaker Co. 68

Johns-Manville 84

Kaiser Aluminum & Chemical Corp. 14, 15
Kamphausen Co., Dan 66
Kearney Corp., James R. 87
Kerite Co. 151
Klein & Sons, Mathias 12
KPF Electric Co. 57
Kuhlman Electric Co. 71

Lapp Insulator Co. Inc. 50, 51
Line Material Co. 3

Maydwell & Hartzell, Inc. 166
Meter Devices Co. 158
Moloney Electric Co. 60, 61

Neo-Ray Products, Inc. 166

Okonite Co. 78
OZ Electrical Mfg. Co. 70

Pacific Coast Electrical Assn. 4th Cover
Pacific Gas and Electric Co. 3rd Cover
Paranite Wire & Cable Div. 89
Pennsylvania Transformer Co. 85, 86
Petersen Engineering Co. 90, 91
Phelps Dodge Copper Products Corp. 67
Pipe Linings, Inc. 164
Porcelain Products, Inc. 20
Preformed Line Products Co. 168

Revere Electric Mfg. Co. 11
Rome Cable Corp. 143, 145

S & C Electric Co. 4
Sangamo Electric Co. 132
Simplex Wire & Cable Co. 83
Smoot-Holman Co. 1
Southern California Edison Co. 2nd Cover
Southern States Equipment Corp. 59
Spang-Chalfant Div., National Supply Co. 126
Square D Co. 161
Standard Oil Co. of Calif. 16
Stober Mfg. Co. 150
Sunbeam Lighting Co. 21

Thomas & Sons Co., R. 69
Tomic Sales & Engineering Co. 82

U.S. Steel Corp. 46, 47

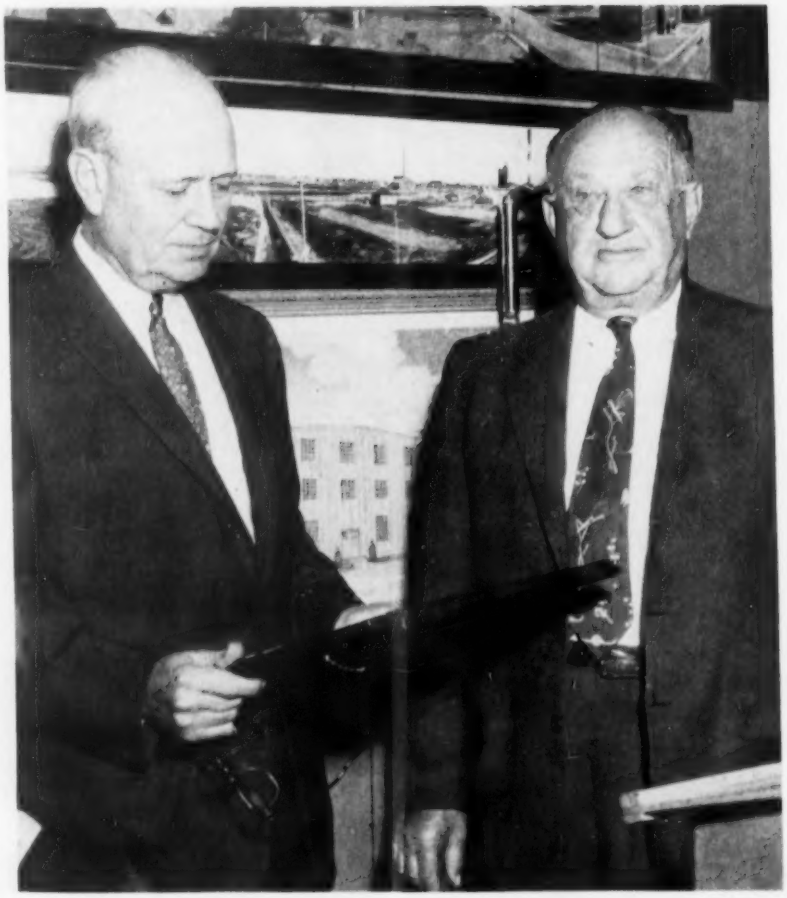
Wagner Electric Corp. 154, 155
Western Insulated Wire Co. 160
Westinghouse Electric Corp. 64, 65, 80, 81, 134, 135
Youngstown Sheet & Tube Co. 72

PROFILES

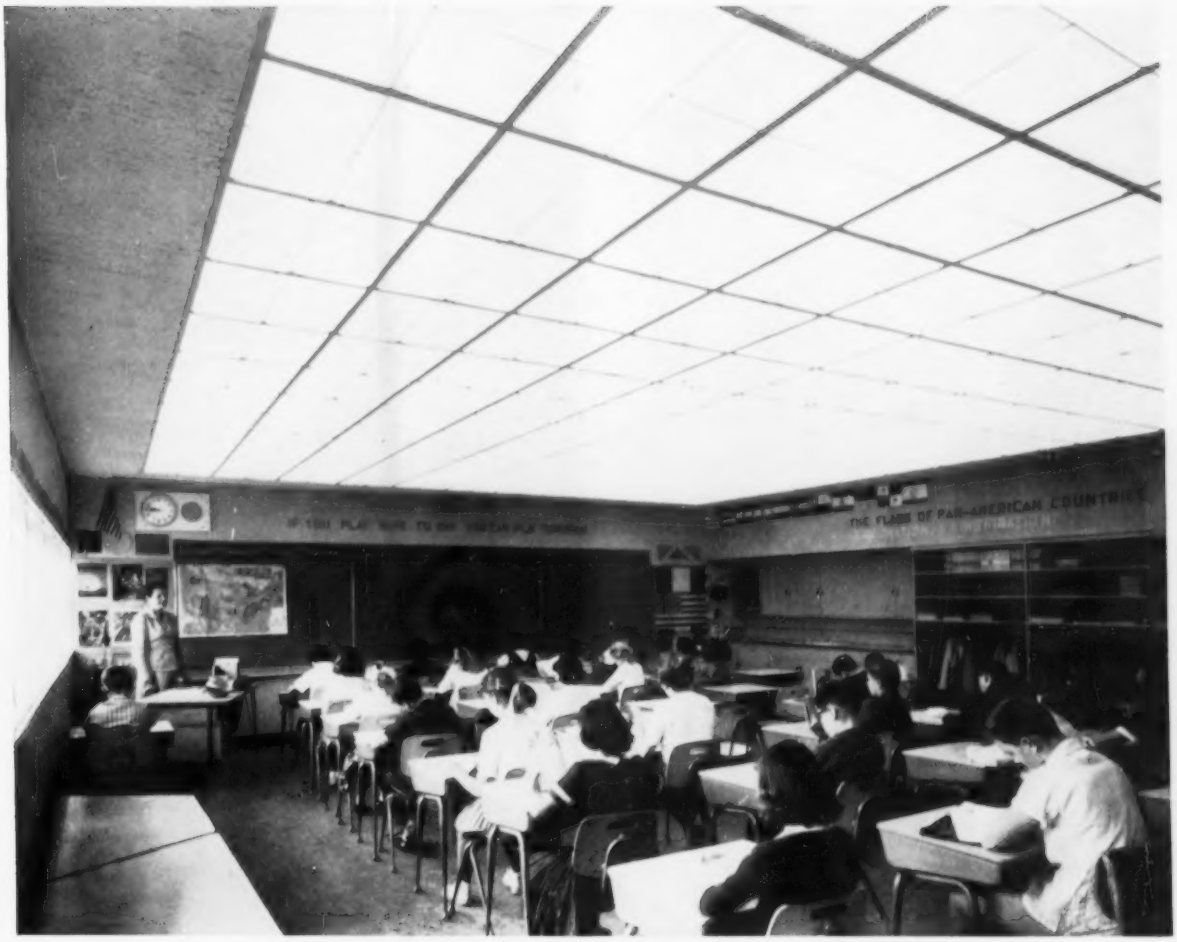
Jerry Collins is the new president of Electric Club of Oregon. He has been chairman of the Oregon Section, Illuminating Engineering Society, too, vice-president of the Electrical Maintenance Engineers of the Columbia River Basin, as well as officer of many civic organizations. His real job is that of manager of commercial sales for Portland General Electric Co., with which he has been associated for 33 years. He also triples as chairman of the commercial and industrial bureau of NELPA this year

Collins

At Public Service Co. of New Mexico, the new generating station to be built in Albuquerque will be named Reeves station in honor of President D. W. Reeves. In the picture below, Arthur Prager, chairman of the board, presents a placque to Reeves, carrying the board resolution naming the station. The presentation was made at the service award dinner held in Albuquerque recently



Prager Reeves



Students *and* teacher enjoy the light from this luminous ceiling at the Pedro Valley School, Sharp Park, California

New luminous ceiling lights the way to faster learning!

See how it lights the room with warm, cheerful light? Soft, shadowless and glare-free, this pleasant light reduces tensions — actually stimulates learning!

More and more, architects and builders are using luminous ceilings, or large-area luminous fixtures, for efficient lighting of both new and old school rooms.

With 165,000 *new* students crowding into California's schools every year, good lighting is more important than ever. P.G. and E.'s lighting engineers will be glad to check existing lighting, or help architects and builders plan proper lighting for *new* school construction.

P·G *and* **E·**
Pacific Gas and Electric Company

FREE! 24-page booklet, "Common Sense in School Lighting." Write P. G. and E., Room 410, 245 Market Street, San Francisco, California.

You do a lot better when you pull together

Whatever your role in this Electric Age—you have one basic selling problem: to convince others they can "Live Better... Electrically"

But you're not alone. The electric industry is investing millions to promote the "Live Better... Electrically" idea. On television. On radio. In national magazines. In newspapers all over the country. The industry will do better – and so will you – if we all pull together. Here's how:

Whenever and wherever you contact the public, promote the "Live Better... Electrically" slogan.

Feature the slogan – and the idea – in all your ads. Spread the word on your letterheads, invoices, mailing pieces and in your house organ. Your PCEA headquarters can tell you how to obtain "Live Better... Electrically" materials.

Write your PCEA headquarters today! It's just good sense – and good business.

PACIFIC COAST ELECTRICAL ASSOCIATION

530 West Sixth Street, Los Angeles 14, California • 681 Market Street, San Francisco 5, California

LIVE BETTER ELECTRICALLY